# Fairmont Prep KT --- NDCAs --- Neg vs. Gulliver Prep

## 1NC

### Contention 1 is Meltdowns

#### Trump is decking NRC independence allowing companies to skip steps causing Fukushima 2.0

Macfarlane 25 [Allison Macfarlane, Professor and director of the School of Public Policy and Global Affairs at the University of British Columbia, 2-21-2025, Trump just assaulted the independence of the nuclear regulator. What could go wrong?, Bulletin of the Atomic Scientists, https://thebulletin.org/2025/02/trump-just-assaulted-the-independence-of-the-nuclear-regulator-what-could-go-wrong/, GZR]

**President** Trump, through his recent Executive Order, has **attacked independent regulatory agencies in the US government**. This order gives the Office of Management and Budget power over the regulatory process of until-now independent agencies. **These regulatory agencies include the Federal Elections Commission, the Federal Trade Commission, the Securities and Exchange Commission, the Federal Energy Regulatory Commission**—and my former agency, the Nuclear Regulatory Commission, which I chaired between July 2012 and December 2014.

**An independent regulator is free from industry and political influence**. **Trump’s executive order flies in the face of this basic principle by requiring the Office of Management and Budget to** “**review**” **these independent regulatory agencies’ obligations** “for consistency with the President’s policies and priorities.” **This essentially means subordinating regulators to the president**.

In the past, the president and Congress, which has oversight capacity on the regulators, stayed at arm’s length from the regulators’ decisions. This was meant to keep them isolated, ensuring their necessary independence from any outside interference. Trump’s executive order implies there are no longer independent regulators in the United States.

Independent regulators should not only be free from government and industry meddling; they also need to be adequately staffed with competent experts and have the budget to operate efficiently. They also need to be able to shut down facilities such as nuclear power plants that are not operating safely, according to regulations. To do this, they need government to support their independent decisions and rulemaking.

**Independence matters**. When I was chairman, I traveled the world talking about the importance of an independent regulator to countries where nuclear regulators exhibited a lack of independence and were subject to excessive industry and political influence. It is ironic that the US Nuclear Regulatory Commission—often called the “Gold Standard” in nuclear regulation—has now been captured by the Trump administration and lost its independence. So much for the Gold Standard; the Canadian, the French, or the Finnish nuclear regulator will have to take on that mantle now.

**To understand what is at stake, one needs to look no further than the Fukushima accident** in March 2011, **which showed the world how a country’s economic security is vulnerable to a captured regulator**. After a magnitude 9.0 earthquake followed by a massive tsunami, the Fukushima Daiichi nuclear power plant, with its six reactors on Japan’s east coast, lost offsite power. The tsunami flooded their backup diesel generators, and the plant fell into the station blackout, leading to the complete loss of all power on site.

With no power to operate pumps to get cooling water into the reactors’ cores or into spent fuel storage pools, three reactor cores melted down—the first within hours of loss of power—with a concomitant release of large amounts of radionuclides due to containment breaches from hydrogen explosions.

Firefighters desperately tried to get water into the spent fuel pool of Unit 4 to ensure that pool water did not boil off since the pumps were no longer working. Should the spent fuel rods have become uncovered and no longer cooled, the fuel’s temperature would rapidly increase, and the fuel rods would melt, causing the release of even larger amounts of radiation material into the atmosphere threatening the Tokyo metropolitan area. Fortunately, the emergency workers got water to the pool within a few days of the fuel being uncovered.

Nonetheless, 160,000 people evacuated from the area near the reactors and along the corridor of radiation contamination to the northwest of the Fukushima Daiichi plant. Overnight, the agricultural and fishing industries near Fukushima were devastated. **Within a year after the accident, all 54 reactors in Japan were shut down**—**a loss of about a third of the country’s electricity supply**. More expensive diesel plants had to be set up to compensate for some of the missing power. The direct economic costs of the accident were estimated to be on the order of $200 billion—and even that number excluded the costs of replacing the lost power and multiple reactor shutdowns due to the reassessment of seismic hazards. **Nearly 14 years later, only 13 nuclear reactors have been turned back on, and 21 have been permanently shut down**. (The other 20 reactors are waiting for regulatory and prefecture approval.)

An independent investigation by the Diet (Japan’s house of parliament) into the cause of the Fukushima accident concluded unequivocally that: “**The TEPCO Fukushima Nuclear Power Plant accident was the result of collusion between the government, the regulators and TEPCO, and the lack of governance by said parties**. They effectively betrayed the nation’s right to be safe from nuclear accidents.” Japan’s government and nuclear industry continue to struggle with the clean-up of the Fukushima site, and it purposely began in 2023 to release still-contaminated water into the Pacific Ocean. Nearby countries responded by banning fishing products from the region.

As the industry often says, **a nuclear accident anywhere is a nuclear accident everywhere**. After the Fukushima accident, the US nuclear industry spent over $47 billion in safety upgrades to respond to lessons learned from the Fukushima accident. **These included the realization that not only more than one reactor could fail at a single power plant**, but also that backup generators needed to be in safe locations, not subject to flooding and other forms of failure; that generic fittings for pumps and equipment were needed so that any nearby equipment could be connected during an accident; that containments should be able to be vented remotely; that natural events such as earthquakes and flooding could be underestimated in the original reactor designs; and that spent fuel pools needed to provide real-time data in accident conditions. The upgrades that resulted from these lessons have greatly increased the safety of reactors in the United States and elsewhere. They were required because each of these upgrades was deemed necessary to address the lessons learned by the independent regulator. On its own, the industry might not have undertaken any of these measures.

What could go wrong? **Several possible outcomes could occur because of Trump’s new executive order assaulting the independence of the Nuclear Regulatory Commission** (NRC).

**Proponents of small modular reactors**, for instance, **have pressured Congress and the executive branch to reduce regulation** and hurry the NRC’s approval of their novel—and unproven—reactor designs. **They wish their reactors could be exempted from the requirements that all other designs before them have had to meet**: **detailed evidence that the reactors will operate safely** under accident conditions. Instead, **these proponents**—some **with no experience in operating reactors**—**want the NRC to trust their simplistic computer models** of reactor performance **and essentially give them a free pass to deploy their untested technology** across the country.

An accident with a new small modular reactor (SMR) would perhaps not make such a big mess: After all, the source term of radiation would be smaller than with large reactors, like those currently operating in the United States. But the accident in Japan demonstrated that countries should expect that more than one reactor at a given site can fail at the same time, and these multiple failures can create even more dire circumstances, impeding the authorities’ ability to respond to such a complex radiological emergency. At Fukushima, the first explosion at Unit 1 generated radioactive debris that prevented emergency responders from getting close to other damaged reactors nearby. Since designers plan to deploy multiple SMR units to individual sites, such an accidental scenario appears feasible with SMRs.

Since its creation in 1975, the Nuclear Regulatory Commission has had an excellent and essential mission: to ensure the safety and security of nuclear facilities and nuclear materials so that humans and the environment are not harmed. **Trump’s incursion means the agency will no longer be able to fully follow through with this mission independently**—and Americans will be more at risk as a result. **If any US reactor suffers a major accident, the entire industry will be impacted**—and perhaps **its 94 reactors in operation will even be temporarily shut down**. Can the industry and the American people afford the cost of losing the independence of the nuclear regulator?

#### AND Energy Secretary Chris Wright has a history of neglecting safety.

Accountable 25 [Accountable US (Accountable.US (A.US) is a nonpartisan, 501(c)3 organization that shines a light on special interests that too often wield unchecked power and influence in Washington and beyond.) February 4, 2025, Watchdog: Senate Confirms Oil Man & Serial Workplace Safety Violator Chris Wright as Trump’s Energy Secretary", https://accountable.us/watchdog-senate-confirms-oil-man-serial-workplace-safety-violator-chris-wright-as-trumps-energy-secretary/, GZR]

WASHINGTON, D.C. – Following the Republican-led Senate’s vote to confirm Chris Wright as U.S. Energy Secretary, Accountable.US Executive Director Tony Carrk released the following statement: “The choice of Chris Wright to run the powerful Energy Department was based on what’s best for the bottom line of Donald Trump’s big oil megadonors, not everyday consumers and workers. With his Project 2025 ties and financial stakes in the big oil and nuclear industry, Wright is just the wealthy insider Trump needs to carry out his plans for padding profits of energy special interests – even if it means higher prices at the pump. And with Wright’s company’s history of violating workplace safety standards and anti-discrimination laws, he’s now in the driver’s seat to sweep such problems under the rug for his industry friends.” BACKGROUND: Conflicts Of Interest With Energy Companies Chris Wright is a member of the board of Oklo nuclear company and has business before the Department of Energy. Oklo’s application before the Nuclear Regulatory Commission was previously denied due to a lack of information about accidents and safety. Chris Wright claims he will step down from the board, but questions remain about whether he will fairly regulate and ensure accountability from energy industries when he has spent so much of his career working for and serving on the boards of oil and gas and nuclear energy companies. Project 2025 Wright has been on the board of the Western Energy Alliance, an oil industry trade group that authored many of Project 2025’s oil and gas provisions. Chris Wright has been a member of the board of Western Energy Alliance (WEA) WEA is an oil industry trade group. WEA’s president authored the oil and gas provisions of Project 2025. Project 2025 would eliminate “key offices at the DOE, including the Office of Energy Efficiency and Renewable Energy, the Office of Clean Energy Demonstrations, the Office of State and Community Energy Programs, the Office of Grid Deployment, and the Loan Programs Office.” Workplace Safety and Racial Harassment Questions remain whether Wright will look the other way when energy companies violate safety standards and anti-discrimination laws, considering his company, Liberty Energy, was frequently fined over workplace safety standards and paid $265,000 to settle lawsuits from black and Hispanic employees who faced hostile work environment and were called slurs. Under Chris Wright’s leadership, Liberty Energy has faced at least three separate penalties for workplace and safety violations since 2023. Liberty Energy, in 2024, paid $265,000 to settle an EEOC discrimination lawsuit after black and Hispanic field mechanics faced racial harassment.

#### Affirming gives Wright the keys.

Lynch 25 [James Lynch, news writer for National Review & B.A. in Political Science from Notre Dame, 2-7-2025, Chris Wright Makes Unleashing Nuclear Power Priority for American Energy Abundance, National Review, https://www.nationalreview.com/news/chris-wright-makes-unleashing-nuclear-power-priority-for-american-energy-abundance/, Willie T.]

In a letter to sent Thursday, American Nuclear Society CEO Craig Piercy suggested that Wright focus securing congressional appropriations to fulfill his promises about advancing the nuclear power industry and supporting innovative reactors.

“Many in the industry think additional government support will be needed to reach nth-of-a-kind nuclear plant construction costs, while others believe rising electricity demand alone will take care of that in time,” the letter reads.

“Either way, as secretary of energy, you will need appropriations to engineer any kind of nuclear ‘win.’ You will spend more time than you think preparing budgets, arguing with the Office of Management and Budget over what’s included, and then defending said budgets on Capitol Hill. Don’t let the bean counters steal from you!”

**Accidents cause BioD Loss.**

Olsson 11 [Henrik von Wehrden, Joern Fischer, Patric Brandt, Viktoria Wagner, Klaus Kümmerer, Tobias Kuemmerle, Anne Nagel, Oliver Olsson, Patrick Hostert, 12-28-2011, Chair of Material Resources, Institute of Environmental Chemistry, Leuphana University Lüneburg, Scharnhorststr, 1, 21335 Lüneburg, Germany "Consequences of nuclear accidents for biodiversity and ecosystem services," Society for Conservation Biology, https://conbio.onlinelibrary.wiley.com/doi/full/10.1111/j.1755-263X.2011.00217.x, DOA: 3/30/2025] JZ

To characterize and quantify the potential consequences of nuclear accidents for biodiversity **and ecosystem services, we reviewed 521** published **studies investigating the impacts of the Chernobyl disaster**, which, until now, has been the only available baseline event to empirically judge the consequences of catastrophic nuclear accidents (see online Supplementary Material for Methods). Specifically, our study aimed to (1) provide a summary of the spatial and temporal patterns of the documented effects of the Chernobyl disaster on a wide range of organisms, and (2) discuss the implications of nuclear accidents for the provision of ecosystem services, again, drawing on documented evidence in the aftermath of the Chernobyl accident. We conclude with four tangible take-home messages, intended to be **directly relevant to debates about the future of nuclear energy.**

Consequences or impacts to species

 Spatially, the documented effects of the Chernobyl disaster broadly follow known fallout patterns (Figure 1). However, variance in radiation levels is extremely high, not only between but also within sites. At a given study location, radiation levels have been shown to vary from 44,300 to 181,100 Becquerel per kilogram (Bq/kg) for mushrooms in southern Sweden (Mascanzoni 2009), from 3,000 to 50,000 Bq/kg for bats in Chernobyl (Gashchak et al. 2010), and from 176 to 587,000 Bq/kg for higher plants in southwestern Russia (Fogh & Andersson 2001); the latter equals almost a hundred times the threshold (600 Bq/kg) set by the European Union for Food that is deemed safe for consumption. High variance in radiation levels means that fallout maps based on extrapolations, models, and climate forecasts are not sufficient to evaluate radiation levels on a fine scale—field data are critically important for this purpose. Furthermore, radiation levels measured in the field and predicted fallout patterns based on meteorological data sometimes do not match (McAulay & Moran 1989), because additional factors, such as dry deposition, are not accounted for by climatic predictors (Arvelle et al. 1990). In addition, **some regions and types of** ecosystems are systematically underrepresented in studies **to date. For example, existing data is sparse for marine and aquatic ecosystems** (Figure 1).

Although many measurements were undertaken in the aftermath of the Chernobyl accident worldwide, existing studies are greatly **biased toward few** taxonomic **groups** (Figures 2 and 3). Most studies have focused on topsoil measurements and accumulation in the plant layer, which is where radiation can be most easily measured. **Despite this bias, it is clear that for most well-studied** groups, greatly **elevated radiation levels can occur up to thousands of kilometers away** from **the disaster** site**.** For example, recorded radiation levels in mushrooms were up to 13,000 Bq/kg in Denmark in 1991 (Strandberg 2003) and up to 25690 Bq/kg in Norway in 1994 (Amundsen et al. 1996).

**The** consequences of elevated radiation levels in many parts of a given ecosystem remain poorly understood, but are likely substantial**.** For example, rats showed changes in sleep behavior after drinking water poisoned with “only” 400 Bq/l (Lestaevel et al. 2006), and onions have shown a significantly elevated rate of chromosomal aberrations at levels as low as 575 Bq/kg (Kovalchuk et al. 1998).

Although numerous studies have investigated physiological and morphological alterations in the vicinity of the Chernobyl accident site, hardly any studies have quantified the possibility of such alterations at larger distances. This could be a major shortcoming, because radiation levels **are known to be greatly increased in some organisms even at large distances from the accident site** (see earlier)—physiological or morphological alterations, therefore, are plausible, at least in isolated instances. Where such alterations occur, their long-term consequences on the ecosystem as a whole can be potentially profound (Kummerer & Hofmeister 2009).

The legacies of the environmental consequences of the Chernobyl accident are still prevalent today, 25 years after the event. Although many studies have shown a peak in radiation immediately after the catastrophe and then a continuous decline, **radiation levels measured throughout the ecosystem are still highly elevated.** For example, radiation levels in mosses (Marovic et al. 2008), soil (Copplestone et al. 2000), and glaciers (Tieber et al. 2009) have remained greatly elevated in several locations around Europe. The long-lasting legacy of the Chernobyl accident was also illustrated by intense wildfires in the Chernobyl region in 2010, which caused a renewed relocation of radioactive material to adjacent regions (Yoschenko et al. 2006). The persistence of high radiation levels can be attributed partly to the half-life rates of the chemical elements involved (e.g., 31 years for Caesium-137; 29 years for Strontium-90; and 8 days for Iodine-131).

In addition to elevated radiation levels, **morphological and physiological changes are by definition long-term in nature, and** can even be **permanent** if **genetic alterations occur**. For example, a range of bird species now have developed significantly smaller brains inside the core zone around the Chernobyl reactor site compared to individuals of the same species outside this zone (Møller et al. 2011). The consequences of such changes on long-term evolutionary trajectories remain largely unknown.

**Lethal mutations following exposure to nuclear fallout** have been **observed in various plant** (Abramov et al. 1992; Kovalchuk et al. 2003) and animal species (Shevchenko, et al. 1992; Zainullin et al. 1992), yet research has mainly been conducted within the Chernobyl region. Morphological changes have also been observed in a wide array of species, including plants (Tulik & Rusin 2005), damselflies (Muzlanov 2002), diptera (Williams et al. 2001), and mice (Oleksyk et al. 2004). In addition, some studies have documented.

**Physiological effects, such as changes in the leukocyte level (Camplani et al. 1999) and reduced** **reproduction** rates (Møller et al. 2008). Changes in genetic structure have been recorded in various organisms, including fish (Sugg et al. 1996) and frogs (Vinogradov & Chubinishvili 1999). More broadly, elevated radiation can negatively affect the abundance of entire species groups, such as insects and spiders (Møller & Mousseau 2009a), raptors (Møller & Mousseau 2009b), or small mammals (Ryabokon & Goncharova 2006).

How low levels of radiation affect different species is poorly understood; studies have suggested that low levels of radiation can have a persistent influence on mutation rates in Drosophila (Zainullin et al. 1992), and can weaken **immune (Malyzhev 1993)** and reproductive **systems (Serkiz 2003) of small mammals;** but again, most studies have been restricted to the Chernobyl accident area. A more obvious measure of permanent change is widespread death of organisms living in the direct vicinity of the disaster site (Figures 1 and 2).

Food web and ecosystem impacts

In addition to effects on individual species, biological **accumulation through the food web can** negatively affect some species—particularly those at higher trophic levels and those depending on strongly affected food items. Bioaccumulation poses a risk to affected species because it **exacerbates exposure to elevated radiation levels, and hence, leads to increased chances of physiological or morphological alterations.** For example, can radiation levels in top predators remain elevated for a long time even when species at lower trophic levels show negligible radiation levels, as demonstrated for the Trench (Tinca tinca) in the Kiev Reservoir (Koulikov 1996).

**Extinction!**

Torres 16 [Phil Torres, biologist, science communicator, 2-10-2016, "Biodiversity Loss and the Doomsday Clock: An Invisible Disaster Almost No One is Talking About," Common Dreams, https://www.commondreams.org/views/2016/02/10/biodiversity-loss-and-doomsday-clock-invisible-disaster-almost-no-one-talking-about, DOA: 3/30/2025] JZ

But there's another global catastrophe that the Bulletin neglected to consider -- **a catastrophe that will almost certainly have conflict** multiplying **effects no less than climate change. I'm referring here to biodiversity loss** -- i.e., the reduction in the total number of species, or in their population sizes, over time. The fact is that in the past few centuries, the loss of biological diversity around the world has accelerated at an incredible pace. Consider the findings of a 2015 paper published in Science Advances. According to this study, we've only recently entered the **early stages of the sixth mass extinction event in life's entire 3.5 billion year history.** The previous mass extinctions are known as the "Big Five," and the last one wiped out the dinosaurs some 65 million years ago. Unlike these past tragedies, though, the current mass extinction -- called the "Holocene extinction event" -- is almost entirely the result of a one species in particular, namely Homo sapiens (which ironically means the "wise man").

"If the environment implodes under the weight of civilization, then civilization itself is doomed."

But **biodiversity loss isn't limited to species** extinctions. As the founder of the Long Now Institute, Stewart Brand, suggests in an article for Aeon, one could argue that a more pressing issue is the reduction in population sizes around the globe. For example, the 3rd Global Biodiversity Report (GBO-3), published in 2010, found that the total abundance of vertebrates -- a category that includes mammals, birds, reptiles, sharks, rays, and amphibians -- living in the tropics declined by a whopping 59% between 1970 and 2006. In other words, the population size of creatures with a spine more than halved in only 36 years. The study also found that farmland birds in Europe have declined by 50% since 1980, birds in North America have declined by 40% between 1968 and 2003, and nearly 25% of all plant species are currently "threatened with extinction." The latter statistic is especially worth noting because many people suffer from what's called "plant blindness," according to which we fail "to recognize the importance of plants in the biosphere and in human affairs." Indeed, plants form the very bottom of the food chains upon which human life ultimately depends.

Even more disturbing is the claim that amphibians "face the greatest risk" of extinction, with "42% of all amphibian species ... declining in population," as the GBO-3 reports. Consistent with this, a more recent study from 2013 that focused on North America found that "frogs, toads and salamanders in the United States are disappearing from their habitats ... at an alarming and rapid rate," and are projected to "disappear from half of the habitats they currently occupy in about 20 years." The decline of amphibian populations is ominous because amphibians are "ecological indicators" that are more sensitive to environmental changes than other organisms. As such they are the "canaries in the coal mine" that reflect the overall health of the ecosystems in which they reside. **When they start to disappear,** bigger problems are sure to follow.

Yet another comprehensive survey of the biosphere comes from the Living Planet Report -- and its results are no less dismal than those of the GBO-3. For example, it finds that the global population of vertebrates between 1970 and 2010 dropped by an unbelievable 52%. Although the authors refrain from making any predictions based on their data, the reader is welcome to extrapolate this trend into the near future, noting that as **ecosystems** weaken**, the likelihood of** further population losses increases. This study thus concludes that humanity would "need 1.5 Earths to meet the demands we currently make on nature," meaning that we either need to reduce our collective consumption and adopt less myopic economic policies or hurry up and start colonizing the solar system.

Other studies have found that 20% of all reptile species, 48% of all the world's primates, 50% of all freshwater turtles, and68% of plant species are currently threatened with extinction. There's also talk about the Cavendish banana going extinct as a result of a fungus, and research has confirmed that honey bees, which remain "the most important insect that transfers pollen between flowers and between plants," are dying out around the world at an alarming rate due to what's called "colony collapse disorder" -- perhaps a good metaphor for our technologically advanced civilization and its self-destructive tendencies.

Turning to the world's oceans, one finds few reasons for optimism here as well. Consider the fact that atmospheric carbon dioxide -- the byproduct of burning fossil fuels -- is not only warming up the oceans, but it's making them far more acidic. The resulting changes in ocean chemistry are inducing a process known as "coral bleaching," whereby coral loses the algae (called "zooxanthellae") that it needs to survive. Today, roughly 60% of coral reefs are in danger of becoming underwater ghost towns, and some 10% are already dead. This has direct consequences for humanity **because coral reefs "provide us with food, construction materials (limestone) and** new **medicines,"** and in fact "more than half of new cancer drug research is focused on marine organisms." Similarly, yet another study found that ocean acidification is becoming so pronounced that the shells of "tiny marine snails that live along North America's western coast" are literally dissolving in the water, resulting in "pitted textures" that give the shells a "cauliflower" or "sandpaper" appearance.

Furthermore, human-created pollution that makes its way into the oceans is carving out vast regions in which the amount of dissolved oxygen is too low for marine life to survive. These regions are called "dead zones," and the most recent count by Robert Diaz and his colleagues found more than 500 around the world. The biggest dead zone discovered so far is located in the Baltic Sea, and it's been estimated to be about 27,000 square miles, or a little less than the size of New Hampshire, Vermont, and Maryland combined. Scientists have even discovered an "island" of trash in the middle of the Pacific called the "Great Pacific Garbage Patch" that could be up to "twice the size of the continental United States." Similar "patches" of floating plastic debris can be found in the Atlantic and Indian oceans as well, although these are not quite as impressive. The point is that "Earth's final frontier" -- the oceans -- are becoming vast watery graveyards for a huge diversity of marine lifeforms, and in fact a 2006 paper in Science predicts that there could be virtually no more wild-caught seafood by 2048.

Everywhere one looks, the biosphere is wilting -- and a single bipedal species with large brains and opposable thumbs is almost entirely responsible for this worsening plight. If humanity continues to prune back the Tree of Life with reckless abandon, we could be forced to confront a global disaster of truly unprecedented proportions. Along these lines, a 2012 article published in Nature and authored by over twenty scientists claims that humanity could be **teetering on the brink of a catastrophic, irreversible collapse of the global ecosystem**. According to the paper, there could be **"tipping points" -- also called "critical thresholds" -- lurking in the environment that, once crossed**, **could initiate radical and sudden changes** in the biosphere. Thus, an event of this sort could be preceded by little or no warning: everything might look more or less okay, until the ecosystem is suddenly in ruins.

We must, moving forward, never forget that just as we're minds embodied, so too are we bodies environed, meaning that **if the environment implodes under the weight of civilization, then civilization itself is doomed.** While the threat of nuclear weapons deserves serious attention from political leaders and academics, as the Bulletin correctly observes, it's even more imperative that we focus on the broader "contextual problems" that **could inflate the overall** probability of **wars and** terrorism in the future**.** Climate change and biodiversity loss are both conflict multipliers of precisely this sort, and each is a contributing factor that's exacerbating the other. If we fail to make these threats a top priority in 2016, the **likelihood of nuclear** weapons **-- or some other form of emerging technology, including** biotechnology and artificial intelligence -- being used in the future will only increase.

Perhaps there's still time to avert the sixth mass extinction or a sudden collapse of the global ecosystem. But time is running out -- the doomsday clock is ticking.

### Contention 2 is Poland

**Poland wants nukes BUT lacks capacity.**

**Naughtie 25** [Andrew Naughtie, BSc in Sociology @ the University of Bristol & MA in Social Sciences from UChicago, 3-21-2025, Could another European country develop its own nuclear weapons?, EuroNews, https://www.euronews.com/2025/03/21/could-another-european-country-develop-its-own-nuclear-weapons, Willie T.]

Building up a nuclear deterrent from scratch is **no easy feat**, but with the US distancing itself from Europe, the idea has **started to resurface.**

“Poland **must pursue** the most advanced capabilities, including **nuclear** and modern unconventional weapons,” Polish Prime Minister Donald Tusk told his country’s parliament earlier this month. “This is a serious race — a race for security, not for war.”

Coming as the Trump administration signalled it is **essentially pulling back** from protecting Europe, Tusk's statement seemed to suggest a potential **lurch toward nuclear weapons** proliferation in Europe — something at odds with decades of European policy.

While questions remain over the US' ongoing commitment to its role as Europe’s nuclear security guarantor, **China is expanding** its nuclear arsenal. And **Russia**, which maintains the world’s largest stockpile of warheads, **repeatedly invokes the threat of using them** to warn NATO and the EU against getting directly militarily involved in Ukraine.

The overall picture raises two difficult questions. How can Europe maintain a continent-wide nuclear deterrent? And is there a possibility that other countries will join the nuclear club?

Although some European states have some of the elements required to develop independent nuclear weapons capability, experts say the chances of another European state going nuclear are **slim.**

Starting from scratch

According to Fabian Rene Hoffmann, a research fellow at the Oslo Nuclear Project, even if one of Europe’s NATO powers were keen to develop its own nuclear weapons rather than simply hosting them, it would find itself at a standing start.

“The major issue European countries are facing is that they either **don’t deploy the civilian nuclear infrastructure** to launch a nuclear weapons programme, or, if they have civilian nuclear infrastructure, that it is highly ‘proliferation-resistant’,” he told Euronews.

“For example, Finland and Sweden only have light-water reactors, which are not suitable for the production of weapons-grade plutonium. In addition, neither of those countries have chemical reprocessing plants that are needed for separating wanted from unwanted isotopes in fissile material production."

**They’ve turned to American company Westinghouse.**

**Hayden 22** [Jones Hayden, Energy & Climate Correspondent @ Politico, 10-29-2022, Poland picks Westinghouse to build its first nuclear plant, POLITICO, https://www.politico.eu/article/poland-picks-westinghouse-to-build-its-first-nuclear-power-plant/, Willie T.]

Poland awarded a contract to build its first nuclear power plant to a **U.S. bid** as the country seeks to burn less coal and increase its energy independence.

The government in Warsaw chose **Westinghouse** for the nuclear project, Prime Minister Mateusz Morawiecki said late Friday in a tweet praising the U.S. company’s “reliable, safe technology.”

“A strong Poland-U.S. alliance guarantees the success of our joint initiatives,” Morawiecki said.

**America’s provided funding BUT only more allows completion.**

**Brodacki 25** [Dominik Brodacki, analyses the energy and fuels sector + co-author of the PI Energy briefing + expert at the Ignacy Lukasiewicz Institute for Energy Policy since 2016 + lawyer for Polish and foreign companies + Author of scientific publications, reports and market analyses, including on energy policy, energy law, nuclear power, offshore wind energy and district heating sector + Graduated in Law and European Studies from the University of Warsaw, 2025, Nuclear Energy in Poland: Assessment of Readiness for the Construction of the First Nuclear Power Plant, Baker McKenzie, https://www.bakermckenzie.com/-/media/files/locations/poland/nuclear-energy-in-poland/baker-mckenzie-polityka-insight-report-nuclear-energy-in-poland-2025\_eng.pdf, Willie T.]

The above also makes it difficult to precisely determine the final cost of building NPP1 (despite the indicative amount of PLN 192 billion given by the Council of Ministers in its notification to the EC). This is because it depends, among other things, on the outcome of the power plant design process (which will determine the specific solutions to be applied), discussions with the EC and the detailed provisions of the EPC contract. As a result, it is not possible at this stage to make a final decision on the detailed method of financing the investment.

**None of the nuclear projects** under construction in Poland has fully secured financing.

The investment in NPP1 is the most advanced in this respect – as mentioned above, its implementation is to be supported by public funds, including in the form of a direct capital injection into the NPP of around PLN 60.2 billion.

In February 2025, the Parliament adopted an amendment to the Special Nuclear Act, according to which state aid will be transferred to PEJ in the form of a capital increase by the State Treasury in exchange for shares in the company. Of this amount, PEJ is to receive for the preparation and implementation of the construction of NPP1 and accompanying investments, as well as its current operations: PLN 4.6 billion in 2025, PLN 11 billion in 2026, PLN 14 billion in 2027, PLN 13 billion in 2028, PLN 11 billion in 2029 and PLN 6.6 billion in 2030.

It is known that their disbursement will be possible only after the EC approval following the notification of the support programme for the construction and operation of NPP1.

Approximately 70% of the construction costs of NPP1 will be covered by **external financing**, of which two-thirds will be provided by export credit agencies and the rest by commercial financial institutions. PEJ has secured declarations (in the form of letters of intent) of financial commitment for approximately PLN 95 billion from, among others: the **Export-Import Bank of the United States** (EXIM), **U.S. International Development Finance Corporation**, Bpifrance Assurance Export, Sfil and Export Development Canada. Taking into account the aforementioned capital injection of around PLN 60.2 billion, there are still **tens of billions missing** to cover the estimated project budget (around PLN 192 billion).

**Empirically, US investment in Westinghouse got the project started.**

**Kraev 21** [Kamen Kraev, senior editor and secretary-general at NucNet, 9-24-2021, Poland/US Wants To Speed Up Westinghouse AP1000 Study, Says Energy Secretary Granholm, NucNet, https://www.nucnet.org/news/us-wants-to-speed-up-westinghouse-ap1000-study-says-energy-secretary-granholm-9-5-2021, Willie T.]

The US government wants to accelerate its support for a front-end engineering and design study for the deployment of **US-made** AP1000 reactor technology in Poland, US energy secretary Jennifer Granholm said.  
  
In July, **US-based Westinghouse** Electric Company and Bechtel Corporation announced the start of the study, which will provide Poland’s Polskie Elektrownie Jądrowe (PEJ) – the company responsible for managing the country’s **first nuclear power project** – with layout plans for the **location** of a first nuclear power station, together with a **licensing** plan, project **schedule** and **cost** estimate.  
  
The **US Trade and Development Agency** has released a grant to fund the study.

“US industry and government have come together at a **critical juncture** in the development of Poland’s nuclear energy programme,” Ms Granholm said during a press conference in Warsaw.

**Competition decks prolif safeguards.**

**Gilinsky 20** [Victor Gilinsky, former Commissioner of the Nuclear Regulatory Commission, and Henry Sokolski, Executive Director of NPEC, 5-15-2020, "“Bad Business: Pushing US Nuclear Exports,” The American Interest – NPEC", Nonproliferation Policy Education Center, https://npolicy.org/bad-business-pushing-us-nuclear-exports-the-american-interest/] //dg

The nuclear industry and the Department of Energy (DOE) want to raid our wallets…again. This time, it’s not to save the planet, but supposedly to give industry a fighting chance against rising Russian and Chinese civilian nuclear export competition.

As Victor Gilinsky and I warn in “The Nuclear Industry at the Feeding Trough,” posted by The American Interest, the American taxpayer shouldn’t buy this.

First, the Russian and Chinese nuclear industry is not as healthy or as influential as claimed. Second, the nuclear industry’s pleas (most recently trumpeted in DOE’s nuclear strategy report, “Restoring America’s Competitive Nuclear Energy Advantage”) presume an American commercial nuclear industry that no longer exists. Westinghouse, General Electric, and Combustion Engineering have sold themselves out to foreign partners and holding companies. US nuclear exports are no longer significant. Also, US nuclear electricity is now more expensive than gas-fired electricity, hydroelectric, and renewables.

Finally, **what the industry is demanding** in regulations to promote **exports** — a **relaxed** approach to nuclear **nonproliferation controls** — **will** actually **undermine** America’s **national security.**

May 15, 2020

AUTHOR: Henry Sokolski and Victor Gilinsky

Bad Business: Pushing US Nuclear Exports

By Henry Sokolski and Victor Gilinsky

The nuclear lobby is playing the national security card in trying to justify federal handouts. It’s a con.

We are getting used to brazen coronavirus claims for federal largess, but it’s hard to beat the claims coming from the nuclear industry. Even before the pandemic hit, it had for the most part given up competing for new power plant sales in the domestic and international energy marketplace and instead was wrapping itself in the flag and declaring itself essential to U.S. national security, and therefore deserving of generous federal support.

This approach has the full backing of the Trump Energy Department, and has been dutifully rolled out as part of the broader scramble for federal relief funds unleashed by the coronavirus crisis. As Energy Secretary Danny Ray Brouillette made clear to radio talk show host Hugh Hewitt in an April 28 interview:

We’ve lost our leadership both on the technology side and on the market side… to the Russians and the Chinese. And why does that matter? Well, obviously it matters, because we are, we were the world leader not only in the development of nuclear technology, but in the export of this technology around the world. And we lost that, and it leads to a national defense issue.

**And, indeed, DOE’s web site announces: “Nuclear power is intrinsically tied to National Security.”** Among the ways DOE plans to restore American nuclear energy leadership are “minimizing commercial fleet fiscal vulnerabilities [DOE-speak for subsidizing],” and “leveling the playing field against state-owned enterprises.”

**The implication is that other countries are not competing fairly, as if they snuck around us to jump the line. Now, to cope with this, we have to sweeten the deals we offer to get the sales.** And as a thriving nuclear sector is **supposedly** a necessary condition for gaining foreign sales, **we have to prop up domestic nuclear plants, too.**

If nothing else, **there is a stunning lack of self-awareness in this view.** Yes, the United States pioneered the light water reactor technology used around the world. But, as a result of U.S. business decisions, in part reflecting the unfavorable economics of nuclear power in the United States but also poor management, we effectively no longer have any reactor manufacturers.

Combustion Engineering, a company with 28,000 employees, a pressurized water reactor manufacturer, sold itself in 1989 to the European firm ABB Asea Brown Boveri Ltd. The great Westinghouse firm, once the world leader on pressurized water reactors, blundered financially into becoming a subsidiary of the CBS Corporation. In 1995, CBS sold it to British Nuclear Fuels Limited. BNFL in turn sold Westinghouse nuclear activities to Toshiba in 2006.

Westinghouse, by then a shell of its former self, performed so miserably in constructing the last large reactors to be built in the United States in South Carolina and Georgia that it went bankrupt and almost took Toshiba down, too. The South Carolina owners canceled their two plants, and the remaining two in Georgia will cost nearly $30 billion, double the original contract price. After this experience, it is hard to see any future sales of large reactors in the United States.

General Electric used to build boiling water reactors, but it only offers sales abroad as a junior partner to Japan’s Hitachi Corporation. Its reputation is anyway tarnished because it designed the plants that failed during the 2011 Fukushima accident. In short, U.S. nuclear plant manufacturing capabilities are much diminished, and the domestic market just isn’t there. And it isn’t there because nuclear economics are extremely unfavorable.

Currently, the US still has 95 power reactors online, supplying a bit less than 20 percent of America’s electrical demand. They are on average 39 years old. Only two plants, the ones in Georgia, are now under construction and they are expected to be the last large ones to be built for some time.

That hasn’t fazed the nuclear faithful both in and out of government. **They still think,** as their predecessors thought sixty years ago, that **nuclear power is the technology of the future. They paint a picture of our putative arch-enemies, Russia and China, selling nuclear power plants and locking up nuclear relationships with numerous states, including important friendly states such as Saudi Arabia and Turkey,** relationships that will last for the rest of the century. We will be frozen out and will thereby lose influence throughout the world. **But it’s still not too late if we follow the advice of the Energy Department, the nuclear industry, and a gaggle of consultants looking to cash in.**

**What is it we have to do? The battles in Washington turn on so-called agreements for cooperation with potential customers that are prerequisites for sales of major reactors and components. The main issue concerns whether we will accept customers that also want to acquire acquires auxiliary facilities that can be used to produce plutonium and highly enriched uranium, the fuels that are also the explosives used in nuclear weapons. The only position consistent with non-proliferation, halting the spread of nuclear weapons, is “no.”**

But the **nuclear enthusiasts** say that’s too strict, that others have more accommodating terms, and that if we sell with **looser terms**, we’ll have more influence. They have their eye especially on Saudi Arabia, a country that at one point said, implausibly, it was going to build 16 nuclear power plants. They don’t seem to pay attention to the other thing the Saudis said—**the crown prince’s statement that if Iran was going to get a bomb, he was going to get one, too, and fast.**

I**t’s not just the Trump** crowd that opposes tightening security rules over nuclear exports (in the name, they say, of security). President **Obama’s** Energy Secretary, Ernest Moniz, has been arguing that subsidizing domestic nuclear power and encouraging nuclear sales without especially tight security restrictions—restrictions that go by the rubric of “gold standard”—are in the interests of U.S. nuclear security, and even support the deterrence value of our nuclear weapons.

All this is a bit much. **Do we really think that Russia, with a GNP below that of Italy, is capable of freezing us out of the world? Does it have the financial capacity to offer generous terms on many projects? Will they ever be completed?**

**Nuclear power is just one U.S. export technology**, and not exactly the most promising. For example, the U.S. exported $136 billion in aircraft last year; U.S. nuclear exports for the same period could only be measured in millions of dollars. **China is building a comparatively large number of nuclear plants but nuclear power supplies less than five percent of its electrical demand** and is only projected to account for seven percent by 2040. **Any large accident will turn this program off**.

**It’s used for hegemonic expansion --- incites Russian fears and conflict.**

**Ramana 24** [M.V. Ramana, Professor @ University of British Columbia’s School of Public Policy and Global Affairs, 8-2-2024, Eastern Europe’s purchase of US nuclear reactors is primarily about military ties, not climate change, Bulletin of the Atomic Scientists, https://thebulletin.org/2024/08/eastern-europes-purchase-of-us-nuclear-reactors-is-primarily-about-military-ties-not-climate-change/, Willie T.]

US officials see the purchase of military equipment as one of the many ways the United States can bring Poland closer in geopolitical terms. Another is to have them buy US nuclear reactors.

In its “**Integrated Country Strategy**” for Poland from June 2022, the US State Department’s top **two mission goals** were stated to involve **military** engagement and adoption of new **energy** technology, **including nuclear power**. The document praises the “potential partnership with the United States to develop large-scale nuclear power plants with US technology” because it “could result in over $18 billion dollars in US exports and strategically tie our two countries even more tightly together over the coming century.” It should be **clear who would profit** most at the expense of the Polish public.

The United States has **historically** tried to use nuclear development to **expand its empire and influence**. During the Cold War, US nuclear power companies “had a **specific agenda** to promote the advancement of nuclear technology in non-communist countries,” which was one reason they **exported nuclear reactors to South Korea.**

By all evidence, the focus on nuclear energy in Eastern Europe appears not to be driven mainly by climate change but by old-fashioned **geopolitics in significant proportion**. Were the urgency of climate change really driving investment in nuclear energy, Poland should have considered purchasing reactors also from Russia or China. In fact, over the past decade, Russia has **dominated the export market** for nuclear power plants and China has **built more nuclear plants** than any other country.

Why it matters. The **geopolitical framing** of imports of nuclear energy is a problem, especially in Eastern Europe where there is an active war in neighboring Ukraine. Building up military forces using US technology and expanding US military presence in the region, even possibly basing nuclear weapons in Poland, may increase the likelihood of a **catastrophic war** between **Russia and NATO**. Such a war would be compounded by the potential for radioactive contamination from deliberate or inadvertent attacks on nuclear reactors, as illustrated by the Zaporizhzhia nuclear plant in Ukraine, which Russia has occupied since March 2022 and used as a source of leverage.

Such **geopolitical games** also make dealing with climate change much more difficult. A geopolitical view, by its very nature, conceives of problems essentially as a **zero-sum competition:** Countries will avoid cooperating with each other. But as happened with the global response to the COVID-19 pandemic, the **lack of cooperation** will undermine the chances of quickly reducing global emissions.

The analyst and disarmament activist Andrew Lichterman recently explained that anyone interested in a more fair, peaceful, and ecologically sustainable global society should avoid using “the conceptual frame of geopolitics” which “is limited to the imperatives of holding and deploying power in what is portrayed as an endless, inevitable struggle for dominance among the world’s most powerful states.”

**Investments** in nuclear power in Eastern Europe hide **geopolitical and military motivations** behind a **smoke screen** of fighting climate change. When these motivations result in the massive acquisition of military equipment, manufacturing and operating them will increase carbon dioxide emissions. Worse, military buildups will also increase the risk of conflict, potentially leading to a **catastrophic war** that could **involve nuclear weapons.**

**Steps to prolif cause pre-emption.**

**Hoffmann 24** [Fabian Hoffmann, Doctoral Research Fellow @ the University of Oslo, 1-29-2024, The Future of the Zeitenwende: Scenario 5—Poland Becomes a Nuclear Power, International Politik Quarterly, https://ip-quarterly.com/en/future-zeitenwende-scenario-5-poland-becomes-nuclear-power, Willie T.]

Similarly, given that Polish nuclear proliferation might occur in the context of a crumbling nuclear order where non-proliferation norms have already been drastically undermined by several other instances of nuclear proliferation, any outcry based on the normative implications of Polish nuclear proliferation may be limited.

Finally, **active steps** by Poland toward a nuclear deterrent may temporarily destabilize the European security environment, due to heightened pressures on the Russian side for military operations aimed at **preempting** a Polish nuclear arsenal. Once Poland has acquired nuclear weapons, Poland’s nuclear deterrent may serve to reinforce European deterrence. This being said, the exact dynamics that a Polish nuclear acquisition might induce into Europe’s security architecture are impossible to predict from today’s point of view.

**NATO-Russia war goes nuclear.**

**Kulesa 18** [Lukasz Kulesa; Director of Proliferation and Nuclear Policy at the Royal United Services Institute; 02-01-2018; "Envisioning a Russia-NATO Conflict: Implications for Deterrence Stability"; JSTOR; https://www.jstor.org/stable/resrep17437; accessed 11-14-2024] leon

Escalation: Can a NATO - Russia conflict be managed?

Once a conflict was **under way**, the “**fog of war**” and **rising unpredictability** would **inevitably** set in, **complicating** the **implementation** of any predetermined theories of escalation, deescalation and inter-conflict management. The **actual** dynamics of a conflict and the perceptions of the stakes involved are **extremely difficult** to predict. **Simulations** and table-top exercises can give only limited insights into the actual decision-making processes and interactions.

Still, Russian **military theorists** and practitioners seem to **assume** that a **conflict** with **NATO** can be **managed** and **controlled** in a way that would bring it to a **swift end** consistent with **Russian aims**. The Russian **theory** of **victory** would seek to **exploit weak points** in an Alliance **war effort**. Based on the **conviction** that **democracies** are **weak** and their leaders and populations are risk-averse, Russia may **assume** that its threats of **horizontal** or **vertical escalation** could be particularly effective. It would also try to bring **home** the **notion** that it has much **higher stakes** in the **conflict** (regime survival) than a majority of the **NATO members** involved, and thus will be **ready** to **push** the **boundaries** of the conflict **further**. It would most likely try to **test** and **exploit** potential **divisions** within the Alliance, combining **selective diplomacy** and **activation** of its intelligence assets in some NATO states with a degree of selectivity in terms of targets of particular attacks.

**Any** NATO-Russia conflict would **inevitably** have a **nuclear dimension**. The role of **nuclear weapons** as a tool for **escalation control** for Russia has been thoroughly **debated** by **experts**, but when and how Russia **might use** (and not merely showcase or activate) **nuclear weapons** in a conflict remains an **open question**. Beyond catch phrases such as “**escalate** to **de-escalate**” or “escalate to win” there are a **wider range** of **options** for Russian **nuclear weapon** use. For example, a single **nuclear warning shot** could be **lethal** or **non-lethal**. It could be **directed** against a purely **military target** or a military-civilian one. **Detonation** could be **configured** for an **EMP effect**. A “**false flag**” attack is also **conceivable**. These **options** might be used to **signal escalation** and could **significantly complicate** NATO’s responses.

Neither NATO nor its member states have developed a similar theory of victory. Public NATO documents stipulate the general goals for the Alliance: defend against any armed attack and, as needed, restore the full sovereignty and territorial integrity of member states. It is **less clear** how far the **Alliance** would be **willing** to **escalate** the **conflict** to achieve these goals, and what **mechanisms** and means it would **use** while **trying** to **maintain** some degree of **control** over the conflict.

The **goals** and methods of **waging** a **conflict** with **Russia** would probably have to be **limited** in order to **avoid** a massive **nuclear exchange**. **Such limitations** would also involve restrictions on striking back against targets on Russian territory. But too narrow an approach could put **too much restraint** on **NATO’s operations**: the Russian **regime’s stability** may ultimately need to be **threatened** in order to **force the leadership** into **terminating** the **conflict**. NATO would thus need to establish what a proportional self-defence response to Russian actions would involve, and to what extent cyber operations or attacks against military targets in quite different parts of Russia would be useful as tools of escalation to signal NATO’s resolve. Moreover, individual NATO Allies, especially those directly affected by Russia’s actions, might pursue their individual strategies of escalation.

With regards to the nuclear dimension in NATO escalation plans, given the stakes involved, this element would most likely be handled by the three nuclear-weapon members of the Alliance, with the US taking the lead. The existence of three independent centres of nuclear decision-making could be exploited to complicate Russian planning and introduce uncertainty into the Russian strategic calculus, but some degree of “P3” dialogue and coordination would be beneficial. This coordination would not necessarily focus on nuclear targeting, but rather on designing coordinated operations to demonstrate resolve in order to keep the conflict below the nuclear threshold, or bring it back under the threshold after first use.

Relying on concepts of **escalation control** and on lessons from the **Cold War** confrontation might be **misleading**. The **circumstances** in which a **Russia-NATO** conflict would **play out** would be **radically different** from the **20th century** screenplay. Moreover, instead of **gradual** (linear) escalation or **salami tactics** escalation, it is **possible** to **imagine** surprizing “**leap frog**” escalation, possibly connected with actions in **different domains** (e.g. a cyberattack against critical infrastructure). Flexibility, good intelligence and inventiveness in responding to such developments would be crucial.

Conflict termination

Russian and NATO assumptions regarding conflict termination would most likely **not survive** the **first hours** of an actual conflict. Both sides are capable of **underestimating** the **resolve** of the **other side** to **prevail** in a conflict and the other side’s **willingness** to commit the necessary resources and **endure** the **costs**, **especially** once **both** sides **start committing** their **political capital** and resources and the casualties accumulate.

#### Extinction!

Sarg 15 [Dr. Stoyan Sarg, 10-9-2015, Director of the Physics Research Department at the World Institute for Scientific Exploration, PhD in Physics, "The Unknown Danger of Nuclear Apocalypse," Foreign Policy Journal, https://www.foreignpolicyjournal.com/2015/10/09/the-unknown-danger-of-nuclear-apocalypse/, accessed: 11-5-2023] // sid

With the new NATO plan for installation of nuclear tactical weapons in Europe, nuclear missiles may reach Moscow in only 6 minutes, and the opposite case is also possible in the same time. The question is: how can we be sure that this will not be triggered by a human error or computer malfunction. An adequate reaction dictated by the dilemma “to be or not to be” and the concept of preventive nuclear strike may lead to a nuclear consequence that is difficult to stop. At the present level of distributed controlled systems and military global navigations, this will lead to unstoppable global nuclear war. However, there is something not predicted, of which the military strategists, politicians and powerful forces are not aware. Probably, it will not be a nuclear winter that they hope to survive in their underground facilities. The most probable consequence will be a partial loss of the Earth’s atmosphere as a result of one or many powerful simultaneous tornadoes caused by the nuclear explosions. In a tornado, a powerful antigravitational effect takes place. The official science does not have an adequate explanation for this feature due to an incorrect concept about space. The antigravitational effect is not a result of the circling air. It is a specific physical effect in the aether space that is dismissed in physics as it is currently taught. Therefore, the effective height of this effect is not limited to the height of the atmosphere. Then in the case of many simultaneous powerful tornadoes, an effect of suction of the earth atmosphere into space might take place. Such events are observed on the Sun and the present physical science does not have an explanation for them. The antigravitational effect is accompanied by specific electric and magnetic fields with a twisted shape. This is observed in tornado events on the Sun. Some effects in the upper Earth atmosphere known as sprites have a similar combination of electrical and magnetic fields but in a weaker form. They are also a mystery for contemporary physical science.

At the time of atmospheric nuclear tests, made in the last century, a number of induced tornadoes are observed near the nuclear mushroom as shown in Figure 1.

The strongest antigravitational effect, however, occurs in the central column of the formed nuclear mushroom. The analysis of underwater nuclear tests also indicates a strong antigravitational effect. It causes a rise of a vertical column of water. In the test shown in Figure 2, the vertical column contains millions tons of water. Thermonuclear bombs are multiple times more powerful. The largest thermonuclear bomb of the former Soviet Union tested in 1961 is 50 megatons. It is 3,300 times more powerful than the bomb dropped by USA on Hiroshima at the second world war and may kill millions.

It is known that Mars once had liquid water and consequently an atmosphere that has mysteriously disappeared. If the scenario described above takes place, the Earth will become a dead planet like Mars. The powerful politicians, military adventurers and their financial supporters must be aware that even the most secured underground facility will not save them if a global nuclear conflict is triggered. Their disgraced end will be more miserable than the deaths of the billions of innocent human beings, including the animal world.

### Contention 3 is Russia

#### Russia’s economy is at the brink --- oil is Putin’s last straw.

Matthews 25 [Owen Matthews, Degree in Modern History at Oxford University, 3-13-2025, The Russian economy is on the brink of collapse and Putin knows it, The Independent, https://www.the-independent.com/news/world/europe/russia-economy-putin-ukraine-war-deal-talks-trump-b2714371.html, Willie T.] \*\*edited for objectionable language\*\*

How close is Russia’s economy to collapse? As Donald Trump’s negotiators open direct talks with the Kremlin, Kyiv’s European allies hope that a final push on sanctions against Russia could be Ukraine’s last – and best – hope of victory. Mr Trump has warned that the US could impose a “devastating” financial blow on Russia if Putin refuses to accept the ceasefire agreement. “There are things you can do that wouldn’t be pleasant in a financial sense. I can do things financially,” he said in the Oval Office.

Putin intended his full-scale invasion of Ukraine to be a three-day operation that would force regime change in Kyiv. Neither Putin nor his military or economic planners anticipated a grinding war that now soaks up over 40 per cent of Kremlin spending.

Nor did they expect Europe to impose serious sanctions, and even less did they anticipate the destruction of three of the four Gazprom gas pipelines under the Baltic Sea that before the war supplied over 30 per cent of Europe’s gas.

The result in Russia has been rampant inflation, currently running at over 9 per cent, crippling [staggering] interest rates of 21 per cent and runaway price hikes on staple goods that far outpace the headline inflation rate and have hit ordinary Russians hard.

Last summer the price of eggs jumped by 42 per cent, bananas by 48 per cent, tomatoes by 39.5 per cent and potatoes by 25 per cent. The Russian ruble has lost over half of its value since Putin first invaded Crimea in 2014, and over $600bn of the Kremlin’s foreign currency reserves have been frozen in Western banks.

More than 1,000 Western businesses – including Ikea and McDonald’s – pulled out, as did Western car manufacturers. Imports of Western goods – especially technology – are now expensively routed through sanctions-busting neighbours like Kazakhstan and Georgia. And last month Russian utility companies hiked prices for electricity by up to 250 per cent.

“Everyone drives Chinese cars these days, but there are no spare parts,” says Alexandra, 39, a former journalist who lives in Moscow and whose ex-husband is fighting in Ukraine. “The only foreign cars you buy are right-hand-drive [from Japan]. Anyone with a mortgage is paying crazy interest. People complain how expensive everything has become.”

Russia spent more on its military in 2024 than the rest of Europe combined, according to the International Institute for Strategic Studies’ latest Military Balance report – a staggering $462bn, if adjusted for purchasing power. The Kremlin’s spending splurge on its war effort has produced some winners, notably the 1.5 million troops currently serving in Putin’s army who are paid up to $2,500 a month to fight – four times the average salary in Russia’s most impoverished provinces.

Massive losses on the battlefield have worsened labour shortages, with a record-low unemployment rate of 2.4 per cent. Factories are running at capacity and beyond. Russia’s economy has “reached the limits of its productive capacity while demand continues to be stimulated,” Central Bank chief Elvira Nabiullina warned the Russian parliament in November, predicting a fatal combination of economic stagnation and inflation known as “stagflation”.

For the first three years of the war, the Kremlin’s war spending fuelled GDP growth which peaked at a staggering 5.4 per cent in early 2024. But 2025 will be the year that growth flatlines, experts predict.

The Kremlin has been able to afford its spending spree thanks, mostly, to India and China, which have continued to import Russian oil in record quantities. The EU has in theory capped the price that customers can pay for Russian Urals crude at $60 a barrel – somewhat below the current market price of $67. But so-called “attestation fraud” – such as making up the difference in fake transportation and other costs – makes the rules easy to bend.

Natural gas has never been sanctioned by the EU at all – and until 1 January of this year, 13 per cent of Europe’s piped gas was still being shipped from Russia through Ukrainian pipelines to Slovakia and Hungary.

Ukrainian fire and fury are currently doing damage to Russia’s war economy that near-nonexistent European sanctions have failed to achieve

Southern Europe continues to import millions of cubic meters of Russian gas via Turkey. And despite its posturing, Europe still sources more than 15 per cent of its liquefied natural gas or LNG from Russia – with some 17.8m tonnes of LNG docking in European ports in 2024, up by more than 2 million tonnes from the year before, according to analysts Rystad Energy.

In fact the only really effective “sanctions” on the Russian energy sector – which accounts for over two-thirds of government revenues – have been in the form of Ukrainian drone attacks on Russian oil refineries, pumping stations and storage facilities. Ukrainian fire and fury are currently doing damage to Russia’s war economy that European “sanctions” have failed to achieve.

International pressure has made it harder, but not impossible, for the Russian war machine to obtain important components such as semiconductors. And sanctions have certainly “achieved the crucial goal of leaving Russia’s economy highly unstable in the medium to long term”, according to Oliver Ruth of London’s Royal United Services Institute.

The current crazy levels of expenditure are unsustainable, so Putin has a strong economic incentive to bring his war to an end. Ukraine’s economy is also under attack.

But on the flip side, even as Russia’s economy slips into stagflation Ukraine’s economy is doing far worse. Concerted Russian assaults, damage to vital energy infrastructure and mass emigration have inflicted catastrophic damage of up to 40 per cent of the country’s pre-war GDP. Kyiv’s budget payments to millions of soldiers and state employees are currently being paid by the EU. Without those subsidies – the lion’s share of the €60bn in direct financial support so far sent by Brussels – Ukraine’s government finances would instantly collapse.

Ukraine’s European allies hoped that sanctions would force Putin into taking an early off ramp and bring his economy crashing down. That hasn’t yet happened yet – largely because Europe has been unable to kick its addiction to Russian gas, and the US did not want to risk a global oil price spike by cutting off Russian exports.

But while they have not brought Putin to his knees, they have made the war disastrous for Russia. As Moscow and Washington begin talks in Riyadh, and European leaders hold their own emergency meeting, keeping up economic pressure on Putin is the real weapon that they still have left in their arsenal.

#### Sanctions won’t come.

Bush 25 [Daniel Bush, Master of Arts in U.S. politics @ Columbia & B.A. from NYU, 3-13-2025, If Trump wants new pressure on Moscow, oil and gas is 'only thing left', Newsweek, https://www.newsweek.com/if-trump-wants-new-pressure-moscow-oil-gas-only-thing-left-2044476, Willie T.] \*\*brackets in original\*\*

Perhaps Trump's best available option to pressure Moscow is the one thing he might be least willing to do, experts said: put a much tighter squeeze on Russia's oil and gas exports, which provide Russia with its main source of revenue and help pay for the war in Ukraine.

"If you're trying to get to a quicker settlement to the conflict in Ukraine, that's what you go after, those continued [Russian] energy sales," said Emily Kilcrease, a senior fellow at the Center for a New American Security. "It's the only thing left."

But Kilcrease said the Trump administration may be hesitant to take a "full-blown approach on energy-related sanctions against Russia, because that would cause additional turmoil" during a moment of rising economic uncertainty at home over the president's trade policies.

Trump's domestic energy agenda also makes it harder for him to go after the heart of Russia's economy. He has blamed his predecessor for the rise in energy prices that was largely driven by Russia's invasion of Ukraine, and ran on a promise to cut costs and lower inflation. A new spike in prices at the pump sparked by tougher energy sanctions on Russia could backfire with voters, analysts said.

"President Trump came in promising to drive prices at the pump down by half. That highlights the delicate needle he has to thread in engaging with Russia on energy right now," said Mark Finley, an energy expert at Rice University's Baker Institute. "I suspect they'll be very cautious about sanctions that would risk taking Russian barrels off the market place."

Russia has found ways to skirt the sanctions, however, including by relying on a so-called "shadow fleet" of vessels to continue exporting oil by sea. Russia has also continued exporting natural gas to parts of Europe and ramped up its energy exports to China, India and other countries that have not participated in the sanctions.

Russian oil and gas revenue increased by 26 percent to $108 billion last year, a Reuters report shows. The European Union spent more on Russian oil and gas in 2024 than it did on financial assistance to Ukraine, according to a study published last month by the Centre for Research on Energy and Clean Air.

So far, the West "hasn't wanted to put real pressure on Russia," Oleksandr Merezhko, the chairman of the Ukraine Parliament's Foreign Affairs Committee, said in a phone interview with *Newsweek.* Trump could do that, he said, "by depriving Russia of the profits it receives from selling oil and gas."

There are several steps the U.S. and allies could take, Merezhko and others said. They include lowering the price cap on Russian oil, cracking down harder on the shadow fleet operators and placing secondary sanctions on companies and trading partners like China that continue buying Russian energy.

#### Affirming decreases oil demand AND insulates Americans from sanctioning Russia.

Zadrowski 24 [William Zadrowski, Squadron Commander @ the USAF Academy & bound for B.S. in Military and Strategic Studies, 12-8-2024, Nuclear Energy: The Overlooked Energy Solution, Modern Diplomacy, https://moderndiplomacy.eu/2024/12/08/nuclear-energy-the-overlooked-energy-solution/, Willie T.]

The U.S. faces a persistent energy worry. Over the last few years, electricity demand has soared while U.S.-based energy suppliers have tried their best to keep up. While energy demand usually fluctuates throughout the year due to varying weather conditions and as the seasons change, the U.S. Energy Information Administration has shown that energy demand has steadily increased over the last fifty years. This can be attributed to population growth and the expansion of electricity production to meet society’s rapidly growing energy needs. While total electricity supply has adequately met the increasing demand over the last fifty years, the steadily increasing need for greater electricity places the U.S. in a vulnerable situation – one that can become susceptible to disruptions and shortages. The power sector already experiences immense strain during peak electricity consumption, namely during periods of intense weather such as heatwaves, snowstorms, and other weather phenomena. Considering the already-strained power sector in the U.S., further concerns about energy security in the U.S. center around the U.S.’s ability to create viable alternative energy solutions to ensure energy demand is met with adequate supply in the event of energy disruptions.

Nuclear Energy: Where It’s Been and Where It’s Going

The U.S.’s energy consumption portfolio consists largely of fossil fuels, accounting for more than eighty percent of the U.S.’s total energy consumption in 2023. Putting aside environmental concerns and considerations, the U.S. needs to invest more in another energy source capable of matching fossil fuel consumption in the near future. The best solution to this concern is nuclear energy. Although the U.S. consumes a significant proportion of available electricity from nuclear sources, roughly nine percent, nuclear energy has the potential to supplement the U.S.’s dependency on fossil fuels. The nuclear power industry cannot replace the need for fossil fuels, nor should it, but it would provide a safety net for supply chain disruptions and create alternatives to domestic energy consumption. This would prove especially important when considering the fragility of fossil fuel imports from foreign sources and the detriment to national security should there be a fossil fuel shortage in the U.S. and/or abroad. For this to happen, though, obstacles to nuclear power production must be overcome.

The U.S. already has nuclear energy production facilities and infrastructure to contribute to the existing energy portfolio, but not nearly at the same scale as fossil fuels. Why might this be? The short answer might be that there exist high initial costs to producing the infrastructure and plants required to make a nuclear reactor; however, the more likely reason would be widespread public opposition to and negative perception of nuclear energy production in the U.S. As many American citizens could point out, nuclear energy’s past is riddled with catastrophic meltdowns and lasting environmental impacts – things that pose obvious issues with public support investment into nuclear energy production. Notable incidents such as the Chornobyl meltdown, the Fukushima disaster, and the Three Mile Island Accident are well-known examples the public tends to associate with nuclear energy. The risk of a nuclear meltdown and severe environmental effects from accidents at nuclear power facilities are legitimate concerns and should not be ignored, however, nuclear power plant infrastructure and production technology have progressed significantly, partially influenced by these notable disasters to prevent similar accidents from ever occurring in the future. The nuclear power industry is not the same as it was some twenty years ago – it has seen significant increases in safety, regulation, and output optimization through new technologies. If the public can continue moving towards greater support for widespread nuclear power production, which appears to be trending that way in recent years, nuclear energy as the main source of consumer energy consumption in the U.S. is a real possibility.

Nuclear Energy as a Domestic Alternative to Fossil Fuels

Nuclear power production for energy’s sake is not the primary reason for the needed increase in nuclear power output. The need for increased output stems from the vulnerabilities in the U.S.’s energy supply and demand trends. Over the last few years, the U.S. has increased its crude oil exports and became a net exporter of crude oil in 2021, according to the U.S. Energy Information Administration. The U.S. being able to produce more crude oil than it consumes is great for energy security interests since it means the U.S. is less dependent on foreign oil, at least when compared to when the U.S. was a net importer of foreign oil. A decreased dependency on foreign fossil fuel imports provides a host of benefits to the U.S. One of these is the increased stability of fossil fuel supply. Considering that the U.S.’s largest source of crude oil and other fossil fuel imports are from areas of the world with complex geopolitical concerns, such as armed conflict, crude oil supply chains face the ever-persistent threat of disruption, whether from direct conflict or supply management used as a tool of coercion, For example, countries that export crude oil may use their production capabilities as a tool of coercion and pressure by restricting the supply of their exports to certain markets, often those that align with their political goals and ideals. This disruption of crude oil was seen following the start of the Russo-Ukraine war, where shortly after the invasion of Ukraine, Russian oil exports were drastically decreased to Western countries following embargoes and sanctions, namely put in place by those in the European Union (EU) and the U.S. These sanctions were designed to be a form of hard power in which the EU and the U.S. aimed to deter Russian aggression in hopes that it would accomplish a political end. Whether or not these sanctions are producing their desired effect is beside the point, but they resulted in the increase in crude oil prices in the U.S. and abroad, since a major exporter of crude oil, Russia, could not supply crude oil to the U.S. In terms of international diplomacy, the U.S. pursued an option to deal with Russia and its invasion of Ukraine which had immediate effects on the U.S. economy and the fossil fuel industry. Whether it proved successful for U.S. interests is yet to be determined, but one thing is certain – if the U.S. had a greater energy consumption available to consumers from nuclear power, crude oil prices may not have increased, as less crude oil and fossil fuels would be needed to power homes, businesses, and other everyday electricity consumers since nuclear power could have reduced the demand for fossil fuels.

#### Decreased demand means more exports.

Rua 13 [Antonio Rua, Senior Economist @ Banco de Portugal & Associate Professor of Economics @ Nova School of Business and Economics, September 2013, Is there a role for domestic demand pressure on export performance?, European Central Bank, https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1594.pdf, Willie T.]

Typically, export performance is modeled as a function of the foreign demand for a country’s output and a country’s price competitiveness indicator. In general, the foreign demand is proxied by the evolution of imports in the trade partners and its relative evolution vis-à-vis exports is used as a measure of market share developments. The relative price advantage of a country over its competitors is often captured by the real exchange rate. Ceteris paribus, a depreciation makes the country’s products cheaper relative to its competitors in the foreign market, which will raise the corresponding demand and increase exports leading to an increase of the market share. These factors are essentially related to the demand side. In fact, most studies do not consider supply side variables explicitly when modeling exports. However, it has been recently widely acknowledged that such determinants are far from able to fully explain export performance (see, for example, Fagan et al. (2001, 2005), di Mauro and Forster (2008), European Commission (2010), Dieppe et al. (2012)). Such evidence reinforces the need to search for other factors that may influence exports dynamics.

In line with some previous literature, this paper suggests considering domestic demand pressure as an additional explanatory variable. In fact, it is likely that domestic conditions influence firms willingness or ability to supply exports. In a context of high domestic demand pressure, firms will work at full capacity and will not be able to follow, in the short-run, external demand increases. In contrast, during a domestic recession, firms will be able to allocate more resources to exports. In other words, in periods of slacking domestic demand firms try to compensate for the decline in domestic sales through increased efforts to export while in boom periods production can be mainly sold on the domestic market. Early work focusing on the short-run effects of domestic demand pressure on exports includes Ball et al. (1966), Smyth (1968), Artus (1970, 1973), Zilberfarb (1980), Faini (1994), Sharma (2003), among others. In those studies it was found a significant negative effect of domestic demand pressure on exports for several countries, including the United Kingdom, the United States, Germany, Israel, Turkey, Morocco and India. Thus, when modeling export performance, one should take into account not only the driving forces of external demand but also domestic demand, as the former affect exports from the demand side and the latter from the supply side. More recently, there has been theoretical and empirical research at the firm level that allows for a better understanding of the negative relationship between domestic demand and exports. Such developments will also contribute to influence the macroeconometric modeling of exports.

In this paper, we revisit the theoretical role of domestic demand pressure on exports and assess its importance on modeling the export performance of the Portuguese economy.1 Besides the recent literature at firm level, such assessment is also motivated by the fact that the standard exports modeling approach is unable to capture properly the Portuguese export performance over the most recent period. In particular, it has been observed a significant and continuous increase of exports market share which cannot be explained by developments on price competitiveness indicators. Such phenomenon is happening along with a dramatic fall of domestic demand. In fact, this relationship could be particularly important in the current economic situation, not only in Portugal but also in other European countries under macroeconomic adjustment and facing strong declines of domestic demand

#### Empirically, increased supply lowers oil prices --- decks Russia’s military and economy.

Cooper 24 [Luke Cooper, Associate Professorial Research Fellow In International Relations @ The London School Of Economics and Political Science, 11-10-2024, Will oil decide the fate of the Russia-Ukraine War?, International Politics and Society Journal, https://www.ips-journal.eu/topics/foreign-and-security-policy/will-oil-decide-the-fate-of-the-russia-ukraine-war-7836/, Willie T.]

Saudi Arabia’s decision to increase oil supply at a time of falling global demand could jeopardise the Russian war effort. With Russia already selling its oil at discounted rates and with higher production costs, a low-price environment in oil markets may impact its ability to finance its aggression in Ukraine.

Russia and Saudi Arabia have previously clashed in oil markets. For a brief one-month period at the outset of the Covid-19 pandemic, Russia launched a foolish price war, increasing production as the world moved into lockdown. Once Saudi Arabia responded in kind, the oil price went into freefall. In an illustration of how geopolitics ‘overdetermines’ oil markets, the trigger for the negotiations that brought the crisis to an end was allegedly US President Donald Trump’s threat to withdraw American military assistance from Saudi Arabia. Under this geopolitical pressure and collapsing market demand, making a price war potentially ruinous for all parties, Russia and Saudi Arabia stepped back, agreeing to the supply cuts required to stabilise world prices.

As recounted in Cambridge professor Helen Thompson’s Disorder: Hard Times in the 21st Century, the oil supply glut in 2014 – 2016 was also shaped by the competitive postures of the United States, Russia and Saudi Arabia. Then as now, Saudi Arabia increased the supply of oil into the world market at a time of falling demand with the economic aim of disincentivising American investment in shale oil and the geopolitical aim of pressuring Russia and Iran to retreat from their support for the Assad regime in Syria. That Russia was able to weather the financial crisis produced by the combination of Western sanctions and the Saudi expansion in oil supply, emerging with the Assad regime intact and Russia’s hold on occupied southern and eastern Ukraine stable, provides a salutary warning for the hope that the present conjuncture may prove problematic for Putin’s regime. But with Russia facing both much more radical external sanctions – in effect its near-removal from the Western trade and financial order altogether – and fighting an enormously costly all-out war against Ukraine, the conjuncture of late 2024 poses a far more serious challenge.

The limits of military Keynesianism

Trends in the global oil market bear down heavily on Russia’s strategic choices. By 2030, the International Energy Agency anticipates that global supply capacity will outstrip demand by some 8 million barrels per day, a situation they describe as ‘staggering’ and ‘unprecedented’ (outside of the Covid-19 pandemic). As Iran and the Gulf States have oil wells close to the surface, making them cost-efficient to extract from, these states are in a much more commercially advantageous position to cope with falling oil prices. Their breakeven price for new drilling projects is also far lower than that of their international competitors, including Russia and the United States.

By moving towards a more competitive posture, Saudi Arabia is challenging America’s more expensive production but also tacitly acknowledging that the OPEC+ group has a diminished price-setting power. For Russia, this is the worst of both worlds. Unlike the United States, it has an oil-dependent economy, which benefits from the cartel power of OPEC+. Yet, unlike Saudi Arabia, its oil is not cheap to extract, making it poorly equipped to deal with low-price conditions. This drives a short-term escalatory logic for Russia’s war on Ukraine, requiring rapid battlefield successes prior to the emergence of low-price oil market conditions.

With oil accounting for between 30-50 per cent of annual state budget revenues since 2014, Russia is, fundamentally, a petrostate.

Russia’s successful adaption of its domestic economy to the war effort has been an important story of the full-scale invasion to date. The Russian state has utilised a suite of policies that Volodymyr Ishchenko, Ilya Matveev and Oleg Zhuravlev identify as ‘military Keynesianism’, with war-related spending stimulating demand in the economy. They note, in particular, the important distributional effects of this in terms of wage growth and industrial expansion, how this may have impacted support for the war effort among the Russian working classes and the internal limits that these policies have encountered in the form of acute labour shortages constraining economic output.

Putting the Russian war economy in a global context that recognises its oil dependency can help us build a fuller picture of its vulnerabilities. While sanctions have ruptured Russia’s relationship to Western markets, this does not make its war economy autarchic. On the contrary, revenues from oil exports are critical. As the Oxford Institute for Energy Studies has argued, the Russian economy is dualistic in the sense that it may be divided between revenue-generating sectors (of which the most important is oil) and revenue-dependent sectors that are sustained through the distribution of rents. With oil accounting for between 30-50 per cent of annual state budget revenues since 2014, Russia is, fundamentally, a petrostate. The Putin regime manages these rents and has drawn on them to fund military aggression in Ukraine.

While Russia has not been publishing trade data since the full-scale invasion, estimates from Bruegel suggest that, despite its successful application of military Keynesian instruments, it continues to fund its trade deficit in non-fossil fuel goods through the sale of fossil fuels (delivering an overall surplus). As these imports are necessary to meet the needs of the Russian populace and the state’s war effort, maintaining the flow of oil rents is critical.

Russia has faced rising costs while selling to markets at a discounted rate (advantaging non-Western buyers in general and India and China in particular).

#### It’s instant AND turns case.

Baltvilks 22 [Witajewski; Expert @ the Centre for Climate and Energy Analyses @ the Polish National Centre for Emission Management; April 26; euractiv; “How the green paradox and climatepolicy can become Putin’s nightmare,” https://www.euractiv.com/section/energy/opinion/how-the-green-paradox-and-climate-policy-can-become-putins-nightmare/; DOA: 3-21-2025] tristan

Russia’s invasion of Ukraine pushed global oil and gas prices even higher than they stood in 2021 because of the Russian export restriction. Many experts believe that further sanctions on Russia, including the gradual isolation of Russia in the sphere of global trade, would keep oil and gas prices high in the medium term.

Ironically, high global prices imply that many Asian countries are more likely to purchase Putin’s oil, especially if it is offered at a lower price. Should this happen, Putin’s oil revenues will remain high, and sanctions by G7 countries will not achieve their primary goal.

This risk can be avoided if sanctions are complemented by a firm climate policy.

The ability of climate policy to influence the oil market and oil prices is illustrated in the so-called green paradox. The green paradox is a hypothetical scenario in which the announcement of a rigid climate policy becomes a signal for oil producers that the demand for oil will end soon, motivating them to sell as much as they can as soon as they can.

Flooding the market with oil depresses its price and incentivises consumers to use more. If this were to happen, emissions would increase, rendering the climate policy ineffective. The green paradox is particularly relevant in the context of oil markets, but the mechanisms of the paradox can also apply to natural gas and coal.

Until recently, the green paradox was a problem for climate change economists, but the one who should be most concerned is, in fact, Vladimir Putin. The green paradox has the potential to turn radical climate policy into a weapon against Putin’s regime. It is especially important because Russia, the second-largest worldwide gas producer and the third-largest oil producer, currently uses fossil fuels as a weapon against the West for the purpose of pacification.

A clear and credible commitment by the largest economies in the world to halve the consumption of oil over the next two decades would be a clear signal to all oil producers that their resources will soon lose value. No producer with low extraction costs will keep its reserves for the future — they will attempt to pump their oil into the market as long as it exists.

Low-cost oil from Saudi Arabia and the United Arab Emirates will, at least partly, crowd out the more expensive product from Russia, Venezuela and Iran. Even if that crowding out is not complete, the low oil price will render these countries’ oil revenues negligible. In Russia, where oil rents constitute more than 9% of the nation’s GDP (36% of public-sector revenue), this will unavoidably complicate the financial landscape of the regime.

#### A losing warfront ensures nukes.

Stein 24 [Janice Stein, founding director of the Munk School of Global Affairs & Public Policy and the Belzberg Professor of conflict management with the Department of Political Science at the University of Toronto, “How impossible is the risk of nuclear escalation in Ukraine?”, Bulletin of the Atomic Scientists, 20 December 2024, https://thebulletin.org/2024/12/how-impossible-is-the-risk-of-nuclear-escalation-in-ukraine/ //akang]

In the bizarre interregnum since the US presidential elections, world leaders have been calling President-elect Donald Trump in Florida before his inauguration on January 20. Some of them worry that the ongoing war between an increasingly desperate Ukraine that kills a Russian general in Moscow as it did this week and an emboldened Russia could spin out of control through miscalculation. The darkest scenario is one that culminates in escalation when Russia detonates a nuclear weapon. How likely is such a scenario in the few weeks left before inauguration day?

The likelihood of nuclear escalation cannot be estimated. The atomic bombings of Hiroshima and Nagasaki by the United States in 1945 are the only cases of the use of nuclear weapons. That strategy was deliberate, not a product of miscalculation, and can best be described as “escalate to de-escalate.” There is no case of nuclear escalation through miscalculation from conventional war to nuclear fighting. No estimate of likelihood has any validity unless there are a large enough number of cases to generate a probability distribution. Nuclear escalation occurs in a world of what Oxford University’s John Kay calls “[radical uncertainty](https://wwnorton.com/books/9781324004776)” in which historical information provides no reliable guidance.

One way to think about nuclear escalation in the context of Russia’s current war against Ukraine is to build scenarios in which Russia uses a nuclear weapon and then trace a logically compelling pathway back to the present. It then becomes possible to ask what conditions could enable such a pathway to escalation.

Tactical nuclear weapon. In one scenario that has been discussed, Russia explodes a tactical nuclear weapon to force Ukraine to end the fighting and agree to cede Crimea and the four Ukrainian provinces that Russia is currently occupying and claiming as its own. Under what conditions is it possible that Russia might adopt such a strategy? Detonating a single tactical nuclear weapon would provide very limited battlefield advantage to Russian forces, and there is some risk that the radioactive fallout could blow back and inflict harm on nearby Russian troops.

Nor would the damage from a single tactical nuclear weapon be grave enough to so demoralize the Ukrainian public that it would buckle under the pressure. If anything, the use of a tactical nuclear weapon would likely radicalize Ukrainians who have been reluctantly moving toward grudging acceptance of a ceasefire.

Were Russia to use a tactical nuclear weapon, such a strategy might backfire. The Ukrainian public might well rally around the flag, unite behind its leader, and stiffen its resistance to ceasefire proposals that are increasingly the subject of discussion inside Ukraine.

Finally, the detonation of a single tactical nuclear weapon—however small its payload—would break the “nuclear taboo” that has held for almost eight decades. In October 2022, encouraged by the United States, Russia’s key partners—China and India—signaled their strong opposition to the use of any nuclear weapon under any circumstances. Now isolated from the West, Russian President Vladimir Putin would not want to alienate his fellow leaders of the nine BRICS countries, which include China, India, and Iran.

There is, therefore, no compelling logic that supports the use of even a single tactical nuclear weapon. What conditions could change that logic?

Russia could face a situation where its forces are being pushed back and out of Ukraine. Putin faced a version of that scenario in the autumn of 2022 when Ukraine’s armed forces were pushing the Russian army back. It was then that the CIA issued the estimate that there was a 50 percent chance that Russia would use a nuclear weapon.

After Ukrainian troops broke through and pushed Russian forces back from Kharkiv in the northeast and Kherson in the south, US intelligence overheard a conversation among senior Russian military commanders about when and how Moscow might use a tactical nuclear weapon in Ukraine. Putin was reportedly not part of these conversations. That intelligence was circulated inside the US government in mid-October. In addition, there are unconfirmed reports that Russia moved some tactical weapons out of storage and loosened operational controls that would make the use of a tactical nuclear weapon easier. It was these two developments that pushed up the US intelligence estimate that Russia might use a nuclear weapon.

Around the same time, Russian Defense Minister Sergei Shoigu, in one of his calls with US Defense Secretary Lloyd Austin, accused Ukraine of planning to use a “dirty bomb.” Concern among Western officials grew that Putin was preparing a false flag operation. Only a long phone call between Gen. Mark Milley, then chairman of the US Joint Chiefs of Staff, and Russian Gen. Valery Gerasimov, reduced the tensions. The most senior military officer from each country discussed Russia’s doctrine governing the use of nuclear weapons and reassured one another. This episode tells us that even when Russian forces were retreating in Ukraine, Putin did not break the nuclear taboo.

Russia has since significantly lowered the threshold of when it would use nuclear weapons. In November 2024, Putin signed a decree amending Russia’s nuclear doctrine in two important ways. The doctrine now declares that Russia has the right to use nuclear weapons against a non-nuclear state that attacks Russia or its allies and is supported by a nuclear power. In addition, Russia’s nuclear doctrine released in 2020 declared that Russia would use nuclear weapons in response to a conventional attack when the very existence of the state is in jeopardy. The new amendment lowers that threshold to a conventional attack that is a critical threat to Russia’s sovereignty or territory.

Putin also railed against the Biden administration’s decision in November to allow Ukraine to use US-supplied longer-range Army Tactical Missile Systems, or ATACMS, against military installations inside Russia and warned that this decision was tantamount to NATO declaring war on Russia. Moscow then launched the Oreshnik, an intermediate-range ballistic missile equipped with multiple warheads, against Ukraine. The missile can carry nuclear warheads. Despite the bellicose rhetoric and the new missile launch, Russia has not loosened operational controls on any tactical nuclear weapons nor moved any of these weapons out of storage. Instead, Gerasimov again reassured the current chairman of the Joint Chiefs of Staff, Gen. Charles Q. Brown Jr., in a phone call that the missile launch was planned long before the announcement about the ATACMS.

## 2NC

### A2: Pollution

#### 0. Their UQ is about oil pipelines but they’d still exist for exports.

**1. Affirming trades off, is less effective, and lacks economic viability.**

**Lovins 21** [Amory B. Lovins, adjunct professor of civil and environmental engineering @ Stanford 12-17-2021, Why Nuclear Power Is Bad for Your Wallet and the Climate, Bloomberg, https://news.bloomberglaw.com/environment-and-energy/why-nuclear-power-is-bad-for-your-wallet-and-the-climate, Willie T.]

Making 10% of world and 20% of U.S. commercial electricity, nuclear power is historically significant but now stagnant. In 2020, its global capacity additions minus retirements totaled only 0.4 GW (billion watts). Renewables in contrast added 278.3 GW—782x more capacity—able to produce about 232x more annual electricity (based on U.S. 2020 performance by technology). Renewables swelled supply and displaced carbon as much **every 38 hours** as nuclear did **all year.** As of early December, 2021’s score looks like nuclear –3 GW, renewables +290 GW. Game over.

The world already invests annually $0.3 trillion each, mostly voluntary private capital, in energy efficiency and renewables, but about $0.015–0.03 trillion, or 20–40x less, in nuclear—mostly conscripted, because investors got burned. Of 259 US power reactors ordered (1955–2016), only 112 got built and 93 remain operable; by mid-2017, **just 28 stayed** competitive and suffered no year-plus outage. In the oil business, that’s called an 89% dry-hole risk.

Renewables provided all global electricity growth in 2020. Nuclear power **struggles to sustain its miniscule marginal share** as its vendors, culture, and prospects shrivel. World reactors average 31 years old, in the U.S., 41. Within a few years, old and uneconomic reactors’ retirements will consistently eclipse additions, tipping output into permanent decline. World nuclear capacity already fell in five of the past 12 years for a 2% net drop. Performance has become erratic: the average French reactor in 2020 produced nothing one-third of the time.

China accounts for most current and projected nuclear growth. Yet China’s 2020 renewable investments about matched its cumulative 2008–20 nuclear investments. Together, in 2020 in China, **sun and wind generated twice nuclear’s output**, adding 60x more capacity and 6x more output at 2–3 times lower forward cost per kWh. Sun and wind are now the cheapest bulk power source for over 91% of world electricity.

Nuclear Power Has No Business Case

Nuclear power has bleak prospects because it has no business case. New plants cost 3–8x or 5–**13x more** per kWh than unsubsidized new solar or windpower, so new nuclear power produces 3–13x fewer kWh per dollar and therefore displaces 3–**13x less carbon** per dollar than new renewables. Thus buying nuclear makes climate change worse. End-use efficiency is even cheaper than renewables, hence even more climate-effective. Arithmetic is not an opinion.

Unsubsidized efficiency or renewables even beat most existing reactors’ operating cost, so a dozen have **closed** over the past decade. Congress is trying to rescue the others with a $6 billion lifeline and durable, generous new operating subsidies to replace or augment state largesse—adding to existing federal subsidies that rival or exceed nuclear construction costs.

But no business case means **no climate case**. Propping up obsolete assets so they don’t exit the market blocks more climate-effective replacements—efficiency and renewables that save even more carbon per dollar. Supporters of new subsidies for the sake of the climate **just got played.**

Fashionably rebranded “**Small Modular” or “Advanced” reactors can’t change the outcome**. Their smaller units cost less but **output falls even more**, so SMRs save money only in the sense in which a smaller helping of foie gras helps you lose weight.

They’ll initially at least **double existing reactors’ cost** per kWh; that cost is ~3–13x renewables’ (let alone efficiency’s); and renewables’ costs will halve again before SMRs can scale. Do the math: 2 x (3 to 13) x 2 = 12–52-fold. Mass production **can’t bridge** that huge cost gap—nor could SMRs scale before renewables have decarbonized the US grid.

Even free reactors **couldn’t compete**: their non-nuclear parts cost too much. Small Modular Renewables are decades ahead in exploiting mass-production economies; nuclear can never catch up. It’s not just too little, too late: nuclear **hogs market space**, **jams grid** capacity, and **diverts investments** that more-climate-effective carbon-free competitors then can’t contest.

#### There argument asserts funding also helps solar and wind but has ZERO warrant so drop it.

**2. T - Uranium and released vapors increase emissions.**

**Jacobson 24** [Mark Z. Jacobson, Professor of Civil and Environmental Engineering @ Stanford, 10-10-2024, 7 reasons why nuclear energy is not the answer to solve climate change, One Earth, https://www.oneearth.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/, Willie T.]

6. Carbon-Equivalent Emissions and Air Pollution

There is **no such thing** as a zero- or close-to-zero emission nuclear power plant. Even existing plants emit due to the **continuous mining and refining of uranium** needed for the plant. Emissions from new nuclear are 78 to 178 g-CO2/kWh, **not close to 0.** Of this, 64 to 102 g-CO2/kWh over 100 years are emissions from the background grid while consumers wait 10 to 19 years for nuclear to come online or be refurbished, relative to 2 to 5 years for wind or solar. In addition, all nuclear plants emit 4.4 g-CO2e/kWh from the **water vapor and heat they release**. This **contrasts** with solar panels and wind turbines, **which reduce** heat or water vapor fluxes to the air by about 2.2 g-CO2e/kWh for a **net difference** from this factor alone of **6.6 g-CO2e/kWh.**

In fact, China’s investment in nuclear plants that **take so long** between planning and operation instead of wind or solar resulted in China’s CO2 emissions **increasing 1.3 percent** from 2016 to 2017 **rather than declining** by an estimated average of 3 percent. The resulting difference in air pollution emissions may have caused **69,000 additional air pollution deaths** in China in 2016 alone, with additional deaths in years prior and since.

**Prefer this on probability because it’s historically verified.**

#### 3. NL - Green power alone fails AND is solved now.

**Meyer 19** [Robinson Meyer, Former Staff Writer @ the Atlantic, 3-5-2019, The Atlantic, There Really, Really Isn’t a Silver Bullet for Climate Change, https://www.theatlantic.com/science/archive/2019/03/why-nuclear-power-cannot-solve-climate-change-alone/584059/, DOA: 3-26-2025]

But you can’t put a nuclear reactor in a tractor-trailer or a steel plant. Nuclear can only reduce emissions from the power sector, and “the energy system is **bigger than just electricity**,” says Sam Ori, the executive director of the Energy Policy Institute at the University of Chicago. “While I think nuclear has real potential as a means to decarbonizing electricity, you **still have a lot of sectors** to worry about.”

In fact, electricity makes up a smaller and smaller part of the climate problem. Right now, the power sector contributes **only about a third** of annual U.S. carbon emissions related to energy production. When you factor in land change and agriculture (read: deforestation and all those pesky cows), electricity is responsible for only about **a quarter** of annual U.S. emissions. And its **share is declining**. Carbon emissions from the U.S. power sector have **fallen 28 percent** since 2005. Meanwhile, emissions from other parts of the economy—transportation, agriculture, industry—have fallen by only 5 percent.

“Even if you figure out electricity, you still have to **figure out industry**. You still have to figure out **transportation**,” Ori told me. Although we have partial answers to some of the problems posed by those sectors—everyone could buy electric cars, for instance, and charge them off the new nuclear-powered grid—we don’t have total ones. We still have no electrified way of moving around **freight**. Electrified **air travel** remains notional. All the nuclear plants in the world could not reduce the importance of oil in **steel production**. Solving all these problems will require some kind of public policy, Ori said; even electric cars won’t replace their gas-powered brethren without a regulatory nudge. Sullivan’s nuclear build-out has **nothing to say** about such challenges.

#### 4. Our conceded Baltvilks card from case is interactive here --- perception of green transitions force companies to sell as much as they can ASAP since they feel their future market is gone.

### A2: Fusion

**1. No scaling --- lack of land, tritium, and the government won’t use it for the grid.**

**Frank 23** [Joshua Frank, award-winning California-based journalist + coeditor of CounterPunch + author of the book Atomic Days: The Untold Story of the Most Toxic Place in America, 1-3-2023, Nuclear Fusion Isn’t the Silver Bullet We Want It to Be, The Nation, https://www.thenation.com/article/environment/nuclear-fusion-fossil-fuel-risks/, Willie T.]

“In a brief moment lasting less than 100 trillionths of a second, 2.05 megajoules of energy—roughly the equivalent of a pound of TNT—bombarded the hydrogen pellet,” explained New York Times reporter Kenneth Chang. “Out flowed a flood of neutron particles—the product of fusion—which carried about 3 megajoules of energy, a factor of 1.5 in energy gain.”

As with so many breakthroughs, there was a catch. First, 3 megajoules isn’t much energy. After all, it takes 360,000 megajoules to create 300 hours of light from a single 100-watt light bulb. So Livermore’s fusion development isn’t going to electrify a single home, let alone a million homes, anytime soon. And there was another nagging issue with this little fusion creation as well: it took 300 megajoules to power up those 192 lasers. Simply put, at the moment, they require 100 times more energy to charge than the energy they ended up producing.

“The reality is that fusion energy will not be viable at scale anytime within the next decade, a time frame over which carbon emissions must be reduced by 50% to avoid catastrophic warming of more than 1.5°C,” says climate expert Michael Mann, a professor of earth and environmental science at the University of Pennsylvania. “That task will only be achievable through the scaling up of existing clean energy—renewable sources such as wind and solar—along with energy storage capability and efficiency and conservation measures.”

Tritium Trials and Tribulations

The secretive and heavily secured National Ignition Facility, where that test took place, is the size of a sprawling sports arena. It could, in fact, hold **three football fields**. Which makes me wonder: How much space would be needed to do fusion on a commercial scale? **No good answer** is yet available. Then there’s the **trouble** with that isotope tritium needed to help along the fusion reaction. It’s not easy to come by and **costs about as much as diamonds**, around $30,000 per gram. Right now, even some of the bigwigs at the Department of Defense are worried that we’re **running out** of usable tritium.

“Fusion advocates often boast that the fuel for their reactors will be cheap and plentiful. That is certainly true for deuterium,” writes Daniel Clery in Science. “Roughly one in every 5,000 hydrogen atoms in the oceans is deuterium, and it sells for about $13 per gram. But tritium, with a **half-life of 12.3 years**, exists naturally only in **trace amounts** in the **upper atmosphere**, the product of cosmic ray bombardment.”

Fusion boosters brush this unwelcome fact aside, pointing out that “tritium breeding”—a process in which tritium is endlessly produced in a loop-like fashion—is entirely possible in a fully operating fusion reactor. In theory, this may seem plausible, but **you need a bunch** of tritium to jumpstart the initial chain reaction, and **doubt abounds** that there’s enough of it out there to begin with. On top of that, the reactors themselves will have to be lined with a lot of lithium, itself an expensive chemical element at $71 a kilogram (copper, by contrast, is around $9.44 a kilogram), to allow the process to work correctly.

Then there’s also a commonly repeated misstatement that fusion doesn’t create significant radioactive waste, a haunting reality for the world’s current fleet of nuclear plants. True, plutonium, which can be used as fuel in atomic weapons, isn’t a natural byproduct of fusion, but tritium is the radioactive form of hydrogen. Its little isotopes are great at permeating metals and finding ways to escape tight enclosures. Obviously, this will pose a significant problem for those who want to continuously breed tritium in a fusion reactor. It also presents a concern for people worried about radioactivity making its way out of such facilities and into the environment.

“Cancer is the main risk from humans ingesting tritium. When tritium decays it spits out a low-energy electron (roughly 18,000 electron volts) that escapes and slams into DNA, a ribosome, or some other biologically important molecule,” David Biello explains in Scientific American. “And, unlike other radionuclides, tritium is usually part of water, so it ends up in all parts of the body and therefore can, in theory, promote any kind of cancer. But that also helps reduce the risk: any tritiated water is typically excreted in less than a month.”

If that sounds problematic, that’s because it is. This country’s aboveground atomic bomb testing in the 1950s and 1960s was responsible for most of the man-made tritium that’s lingering in the environment. And it will be at least 2046, 84 years after the last American atmospheric nuclear detonation in Nevada, before tritium there will no longer pose a problem for the area.

Of course, tritium also escapes from our existing nuclear reactors and is routinely found near such facilities where it occurs “naturally” during the fission process. In fact, after Illinois farmers discovered their wells had been contaminated by the nearby Braidwood nuclear plant, they successfully sued the site’s operator, Exelon, which, in 2005, was caught discharging 6.2 million gallons of tritium-laden water into the soil.

In the United States, the Nuclear Regulatory Commission (NRC) allows the industry to monitor for tritium releases at nuclear sites; the industry is politely asked to alert the NRC in a “timely manner” if tritium is either intentionally or accidentally released. But a June 2011 report issued by the Government Accountability Office cast doubt on the NRC’s archaic system for assessing tritium discharges, suggesting that it’s anything but effective. (“Absent such an assessment, we continue to believe that NRC has no assurance that the Groundwater Protection Initiative will lead to prompt detection of underground piping system leaks as nuclear power plants age.”)

Consider all of this a way of saying that if the NRC isn’t doing an adequate job of monitoring tritium leaks already occurring with regularity at the country’s nuclear plants, how the heck will it do a better job of tracking the stuff at fusion plants in the future? And as I suggest in my new book, Atomic Days: The Untold Story of the Most Toxic Place in America, the NRC is plain awful at just about everything it does.

**Instruments of Death**

All of that got me wondering: If tritium, vital for the fusion process, is radioactive, and if they aren’t going to be operating those lasers in time to put the brakes on climate change, what’s really going on here?

Maybe some clues lie (as is so often the case) **in history**. The initial idea for a fusion reaction was proposed by English physicist Arthur Eddington in 1920. More than 30 years later, on November 1, 1952, the first full-scale US test of a thermonuclear device, “Operation Ivy,” took place in the Marshall Islands in the Pacific Ocean. It yielded a mushroom-cloud explosion from a fusion reaction equivalent in its power to 10.4 Megatons of TNT. That was 450 times more powerful than the atomic bomb the United States had dropped on the Japanese city of Nagasaki only seven years earlier to end World War II. It created an underwater crater 6,240 feet wide and 164 feet deep.

“The Shot, as witnessed aboard the various vessels at sea, is not easily described,” noted a military report on that nuclear experiment. “Accompanied by a brilliant light, the heat wave was felt immediately at distances of thirty to thirty-five miles. The tremendous fireball, appearing on the horizon like the sun when half-risen, quickly expanded after a momentary hover time.”

Nicknamed “Ivy Mike,” the bomb was a Teller-Ulam thermonuclear device, named after its creators Edward Teller and Stanislaw Ulam. It was also the United States’ first full-scale hydrogen bomb, an altogether different beast than the two awful nukes dropped on Japan in August 1945. Those bombs utilized fission in their cores to create massive explosions. But Ivy Mike gave a little insight into what was still possible for future weapons of annihilation.

The details of how the Teller-Ulam device works are still classified, but historian of science Alex Wellerstein explained the concept well in The New Yorker:

The basic idea is, as far as we know, as follows. Take a fission weapon—call it the primary. Take a capsule of fusionable material, cover it with depleted uranium, and call it the secondary. Take both the primary and the secondary and put them inside a radiation case—a box made of very heavy materials. When the primary detonates, radiation flows out of it, filling the case with X rays. This process, which is known as radiation implosion, will, through one mechanism or another…compress the secondary to very high densities, inaugurating fusion reactions on a large scale. These fusion reactions will, in turn, let off neutrons of such a high energy that they can make the normally inert depleted uranium of the secondary’s casing undergo fission.”

Got it? Ivy Mike was, in fact, a fission explosion that initiated a fusion reaction. But ultimately, the science of how those instruments of death work isn’t all that important. The takeaway here is that, since **first tried out in that monstrous Marshall Islands** explosion, fusion has been intended as a **tool of war**. And, sadly, so it remains, **despite all the publicity** about its possible use some distant day in relation to climate change. In truth, any fusion breakthroughs are potentially of critical importance not as a remedy for our warming climate but for a **future apocalyptic world of war**. Despite all the fantastic media publicity, that’s how the US government **has always seen it** and that’s why the latest fusion test to create “energy” was **executed in the utmost secrecy** at the Lawrence Livermore National Laboratory. One thing should be taken for granted: The American government is interested **not** in using fusion technology to power the energy grid, but in using it to further strengthen this country’s already massive arsenal of **atomic weapons.**

Consider it an irony, under the circumstances, but in its announcement about the success at Livermore—though this obviously wasn’t what made the headlines—the Department of Energy didn’t skirt around the issue of gains for future atomic weaponry. Jill Hruby, the department’s undersecretary for nuclear security, admitted that in achieving a fusion ignition, researchers had “opened a new chapter in NNSA’s science-based Stockpile Stewardship Program.” (NNSA stands for the National Nuclear Security Administration.) That “chapter” Hruby was bragging about has a lot more to do with “modernizing” the country’s nuclear weapons capabilities than with using laser fusion to end our reliance on fossil fuels.

“Had we not pursued the hydrogen bomb,” Edward Teller once said, “there is a very real threat that we would now all be speaking Russian. I have no regrets.” Some attitudes die hard.

Buried deep in the Lawrence Livermore National Laboratory’s website, the government **comes clean** about what these fusion experiments at the $3.5 billion National Ignition Facility (NIF) are really all about:

NIF’s high energy density and inertial confinement fusion experiments, coupled with the increasingly sophisticated simulations available from some of the world’s most powerful supercomputers, increase our understanding of **weapon physics**, including the properties and **survivability of weapons-relevant materials**.… The high rigor and multidisciplinary nature of NIF experiments play a key role in attracting, training, testing, and retaining new generations of skilled stockpile stewards who will **continue the mission** to protect America into the future.

Yes, despite all the media attention to climate change, this is a rare yet intentional admission, surely meant to frighten officials in China and Russia. It leaves little doubt about what this fusion breakthrough means. It’s not about creating future clean energy and never has been. It’s about “protecting” the world’s greatest capitalist superpower. Competitors beware.

Sadly, fusion **won’t save the Arctic** from melting, but if we don’t put a stop to it, that breakthrough technology could someday **melt us all.**

**2. Consistency and handling plasma is impossible --- err neg to reject aff delusion.**

**Locke 14** [Susannah Locke, master’s degree in science, health, and environmental journalism from NYU, 4-16-2014, Nuclear fusion could be the perfect energy source — so why can’t we make it work?, Vox, https://www.vox.com/2014/4/16/5580192/the-comprehensive-guide-to-fusion-power, Willie T.]

Which approach to fusion has the best chance of success?

If people had to pick one, most would put their money on ITER. That's because NIF only researches fusion power as a side project — its main task is performing studies that help maintain and test the US nuclear arsenal.

there's a good chance **no one** will succeed

However, there’s also a good chance that no one will succeed in producing practical fusion power. What scientists are currently doing are research projects that **won’t be hooked up to the power grid.** And getting a machine to do fusion for a **split second** every once in a while is nothing compared with building an actual power plant that can **withstand the trauma** of doing fusion **all the time.**

It’s a major engineering challenge, and some say that making a commercial power plant will be even harder than getting fusion to work in the first place.

Why is fusion power so difficult?

One big reason is that it requires working with plasma, which is **really tricky**. Because plasmas aren’t that common on Earth, scientists had **very little experience** with them until they started studying fusion.

Plasma is **difficult to hold**: The plasma used in fusion-energy research is **hundreds of millions** of degrees Fahrenheit. You can’t hold it using a solid container, because the **container would just melt**. Instead, physicists have to corral it using electromagnetic fields or work with it so quickly (in less than a billionth of a second) that holding it isn’t an issue.

Plasma is difficult to compress: If you don’t compress plasma from all sides perfectly evenly, it will **squish out** wherever it can. Scientific American explained this well: “Imagine holding a large, squishy balloon. Now squeeze it down to as small as it will go. No matter how evenly you apply pressure, the balloon will **always squirt out** through a space between your fingers. The same problem applies to plasmas. Anytime scientists tried to clench them down into a tight enough ball to induce fusion, the plasma would find a way to **squirt** out the sides.”

Will we ever get fusion power?

The folks associated with ITER say that they'll have plasma in the reactor in 2020 and will be doing fusion by 2027. But the project has been dogged by delays, not to mention a very negative review of its management recently. So take those dates with a giant grain of salt.

fusion research has a long history of always being **20 years away**

More broadly, fusion power research has a very **long history of always promising** that success is just 20 years away. It also has had its share of **wackos**, **hucksters**, and well-meaning, but **blindly optimistic** scientists. For a good, pessimistic argument of why fusion power will never happen, check out journalist Charles Seife’s Slate piece from a few years back.

#### 3. Tennebum concedes lack of professors is an ALT CAUSE

US falling behind China in race to nuclear fusion Fusion Industry Association CEO Andrew Holland says private players need more state support if US to lead the fusion energy revolution  by Jonathan Tennenbaum December 24, 2024  A component in the laser system at the Lawrence Livermore National Laboratory, where scientists successfully achieved "ignition" to produce a fusion reaction. Photo: Damien Jemison / Lawrence Livermore National Laboratory China is moving with awesome speed to take the global lead in realizing nuclear fusion as a commercial energy source. With the scheduled completion of the Comprehensive Research Facility for Fusion Technology (CRAFT) in Hefei Province in 2025, China will possess a unique scientific and engineering infrastructure for its fusion effort.  A prototype fusion power plant, the China Fusion Engineering Test Reactor, is on the drawing boards, and a key intermediate step, the Burning Plasma Test Reactor, will go into operation in 2027. China’s EAST fusion reactor holds the record for plasma containment; and other important fusion experiments are in progress in different locations of the country.  Given the stream of positive fusion news from China, one cannot avoid asking: Where is the US? Due largely to the shameful lack of commitment from the Federal government, the US is in danger of losing the world leadership position in fusion which it had occupied for nearly three-quarters of a century.  This is nothing less than a scandal, given all the talk in Washington about maintaining the US edge in technology vis-à-vis China. Fortunately for the US, private sector investments in fusion have grown dramatically, and US private companies are moving ahead with a variety of ambitious and promising projects aimed at achieving commercial power generation by fusion in the not-too-distant future.  We asked Andrew Holland, CEO of the Fusion Industry Association (FIA), for his take on the situation of fusion in the US and China. The FIA has established itself as the voice of the private fusion industry worldwide.  The present interview follows up an earlier one that Asia Times published in January 2021 in three installments, which can be read here, here and here. Asia Times Senior Science correspondent Jonathan Tennenbaum conducted the interview.  JT: In the Fusion Industry Association’s White Paper, “Bringing Fusion to the US Grid”, you wrote about the need for a decisive shift in prioritization of fusion R&D by the US government. And you contrast the lack of sufficient support by the US government to fusion with China’s ambitious fusion program, which is moving ahead rapidly. How would you compare the fusion effort in the US with what’s going on in China?  AH: The US has been a global leader in fusion since the very beginning of fusion research by governments back in the ’50s. The United States, first working with the UK and then with Japan and Europe as well, has always been the leading country in pushing forward research, first in plasma physics, and then concerning how to move towards a fusion energy break-even power plant.  China has not been a player in that until the last 20 years or so. When China joined the ITER (International Thermonuclear Experimental Reactor) program just over 20 years ago, China started to make investments to bring China up to world leader status. Investments in experiments, into infrastructure and also into people – plasma physicists and the institutions that are necessary to train them and to build and run experiments.  This also came at a time of relative openness in the global system. A lot of the leading Chinese scientists have done work in US and European labs and Japanese labs. There is a long history of collaboration, both in ITER and elsewhere.  The US program on fusion has always been ambitious, but perhaps lacking in funding to allow follow through, is what I would say. There are a couple of things I think are important to say.  For seven straight years now, Congress has appropriated more money every year into the Department of Energy’s Fusion Energy Science Program. So there has been a growth in funding into fusion, sometimes in significant jumps, sometimes in relatively small jumps.  Along with that has come new legal authorizations, directing the Department of Energy to create not only a fusion science program but a program that has the mission of delivering fusion energy-delivering a pilot plant. There has been a slow move towards commercialization.  Unfortunately, the US program is pretty heavy on legacy-funded programs. There is an expression here in [Washington] DC that there are certain mortgages that the DOE has to spend on every year and which take up a very significant portion of that funding.  These programs are focused largely on legacy R&D programs, rather than forward-thinking commercially relevant programs. So it’s very hard to say we’re transitioning a DOE program when the vast majority of the program and budget goes to spending on these mortgages.  Spending on these programs may be important for many reasons, like basic science and understanding of plasma physics, but really aren’t that important for the actual commercialization of fusion energy.  At the same time, some new programs have been authorized and started in the Department of Energy. Notable among them are public-private partnerships, like the INFUSE (Innovation Network for Fusion Energy) program and the milestone-based public-private partnership.  There is also a new program called Fusion Innovative Research Engine (FIRE) Collaboratives, which are research centers that are focused on the key problems for commercialization — things like materials and fuel cycle and so forth. But the actual funding for these programs is still a smaller percentage than the legacy programs. So we haven’t yet seen this transition.  Now, China isn’t bound by these legacy programs nearly as much, and has been able to make investments focused towards building a commercialization program.  Basically, if you look at the US in the late 20-10s, there was a request from the then Undersecretary for Science Paul Dabbar to the fusion community, saying, essentially, “give me a community plan for what to do with the fusion program. Everybody should come together, and give us the consensus.” And they did.  The result was a long-range plan, delivered very early in 2021, that laid out the steps and programs and investments that needed to be made, to start to deliver a fusion pilot plant. Shortly thereafter, the US National Academy of Sciences put out their own report saying: okay, this is what you need to do to deliver a pilot plant.  Ironically, in fact, that’s about the same time that the Fusion Industry Association (FIA) was officially formed. We became an independent association in May 2021. Then, in March of 2022, the White House hosted a fusion summit and declared what they call a Bold Decadal Vision for commercial fusion.  So the US fusion community and the US government have a plan for what they need to do to deliver a pilot fusion power plant and bring fusion energy to the stage of commercialization. The challenge is, that the actual budget of the Fusion Energy Science Program has basically not changed at all.  The truth is, we have all the plans we need; we just need to implement them. We need Congress to fund the money. We need the President to request the funds sufficient to do the job. And then you turn around and look across the Pacific to China.  Latest stories US to tariff Japanese autos ‘to be fair’ US to tariff Japanese autos ‘to be fair’ A Cold Truce A Cold Truce US chip-making dream awakes to labor crisis reality US chip-making dream awakes to labor crisis reality They have almost completed a new facility they are calling CRAFT. This is basically a place where they put all the fusion test stands together. All the projects that are listed in the US’ long-range plan are being built right now or have already been completed, but in China!       Meanwhile, nothing new has come out of the US program. It is difficult to see how this is moving forward. The truth, though, is that the ambition in the United States is not with the US government. The ambition in the United States is with the private companies. The private companies are still moving forward. Funding is flowing into these companies.  There is not much from the US government, but significant funding is flowing into these companies from investors, venture capital, strategic investors. The growing, American-led industry is basically a testament to the power of the American capitalist system that I think we could be on the verge of getting there. We’ve seen this happen before.  JT: In China, the government is evidently committed to a real battle plan for fusion. As you said, this is not only on paper, but the Chinese are building and building and building. That was the way the US used to do things in the ’50s and ’60s in practically every field of science and technology. The philosophy was to just go ahead and build a lot of things and see what works. What has happened to that spirit?  AH: I don’t think it’s gone. I think it’s just lost from the United States government. If you are talking about building things, look at Commonwealth Fusion Systems for example.  They are building a demonstration-class tokamak in Devens, Massachusetts, right now. Look at Helion in Everett, Washington, just north of Seattle, building their demonstrator machine called Polaris. Zap Energy, in the same area, is testing their FuZE-Q machine right now. I could name many more companies actively building right now.  So there’s no shortage of building in fusion happening now in the private sector. In fact, we even see the philanthropic sector getting involved. MIT has found a number of philanthropic investors who want to invest in building a cyclotron that can function as a user facility for the fusion industry to test materials on. This is happening largely without US government support.  JT: Apart from the need to increase its scandalously low fusion budget, what things should the US government be doing now? How does this relate to what the private sector is doing?  AH: If the US wants to secure its leadership, certain things need to happen. You have to build the infrastructure for a commercialization program. What that means is that you need to build materials test stands, you need to build fuel cycle test centers, and so on.  You need to have user facilities that the government builds, and private industry can utilize. A good example is in the aerospace industry: the government builds the wind tunnels and then industry comes in, and pays for access to those facilities. Classical economics says that such public goods would be underinvested, if the government doesn’t step in.  The second thing the government should be doing, but hasn’t been nearly enough, is to be investing in the companies directly, to help them move towards the goal of fusion pilot plants. This has a real catalyzing effect. Public-private partnerships enable companies to secure investment, to secure more private dollars.  Government dollars have that effect in such an ambitious field as fusion. Investors still think that, ah, this is a wildly uncertain area. But if the government comes in and says, we’re directly putting dollars into this company, this is a seal of approval saying that it is worthwhile to invest in it.  This is a real way to accelerate investment into fusion pilot plants. Governments around the world have understood that if they don’t support investment into new technologies, other countries will.  The CHIPS Act, providing $54 billion dollars of funding to build new semiconductor manufacturing facilities in the United States, was adopted because other countries had subsidized this industry so much that it would have taken this strategic industry away from the United States.  To me, there is nothing more strategic than fusion. This is zero-carbon energy without a scarce fuel source; something that can deal with energy security and deal with our problems of scientific leadership right away. This is a strategic industry that any government should want to not only have, but lead, in their country.  The United States has put really good plans in place. I want to be clear about that. The milestone-based public-private partnership is a really good program. The INFUSE program is a really good program. But the amount of money is so small that it really is not impactful to any decision-making by companies at this point.  JT: Why is there not more priority placed on fusion? Is the problem on the level of bureaucratic thinking?  AH: In politics and government, the status quo reigns over any change unless there is a push from the top.  JT: Well, that brings me to a central question. Nowadays everybody is talking about China as the Number One strategic competitor or even adversary of the United States, and people are increasingly aware that China is in the process of surpassing the US in many areas.  The Chinese government has clearly identified fusion as a key strategic area, and China clearly aims to get there first, in terms of realizing a fusion pilot plant and developing a commercial fusion industry. I would think that should spawn the US to say, we had better get moving, otherwise the Chinese will beat us. But apparently, that message has not yet gotten through.  AH: Well, even if it has gotten through, it’s all about timing in Washington. You shouldn’t expect major new programs at the end of a president’s four-year term. It’s all about when you have a divided government versus when you have unified government.  I expect that in 2025, there will be new pushes for legislation from Congress to bolster America’s competitive position vis-à-vis China and the rest of the world. The Trump Administration has goals to shake things up and disrupt the status quo.  The United States is not a place where things happen linearly. Things move in an episodic way. At the beginning of the Biden administration, there was the Bipartisan Infrastructure Law, followed by the CHIPS and Science Act, followed by the Inflation Reduction Act, all of which amounted to an extraordinary amount of funding going into high-tech and energy fields. But what went into fusion was really only a cash payment to help build ITER in the South of France.   What we’re pushing for, and we expect to see in the new Congress in 2025, is new competitiveness funding. And we hope that fusion will be part of that.  We have a plan. We’ve put forward a $3 billion supplemental funding request, and we think there is a case that it should be expanded up to a $5 or $10 billion supplemental funding request. This is money outside the annual appropriations funding that would go to building fusion infrastructure and supporting public-private partnerships in fusion.  JT: Let me bring up the China issue once more, in terms of manpower. I saw a figure that China has ten times as many PhDs in fusion science and engineering as the US.. Shouldn’t that be a signaI for rethinking in the US?  Once upon a time, China depended for much of its top-level knowledge and skills on students sent to the West. Those times are gone. Now, China produces its own top-level fusion scientists and engineers at a far greater rate than the US. Shouldn’t the US be concerned about that, if the US wants to retain its leading position?  AH: I actually don’t worry about that problem. The workforce issue is a market issue. And if there’s a market pull, we’re going to find the workers for it. That’s the great benefit of the American system, the combination of government, philanthropic universities and private sector working together.  I think there’s a reason why the US has a leading position in higher education, with by far the largest percentage of the top 100 universities of any country in the world. US universities are market-oriented, so they listen to what the students want, and make the investments.  I’m worried more at the top level. The top level of government funding is just not there. And so we may get these universities to invest in PhD plasma physicists, but then they go to work in the UK or in Germany. That’s more what I worry about.  JT: What has happened to the US national labs that were formerly carrying the ball in terms of fusion research? It seems that hardly any new experiments are being built there.  AH: The national labs are the crown jewel of American science. They are the ones that get the funding from DOE. The vast majority of the $800 million fusion budget is going into national labs or into the General Atomics DIII-D facility, which is basically a national lab-class facility.  I want to be clear that the national labs are doing really important science. But we need to see the transition from science for physics’ sake to science for commercialization’s sake.  If you look at a pie chart of where the $800 million DOE funding for Fusion Energy Sciences goes, the largest chunk, $240 million goes to ITER. The next largest goes to DIII-D, which is a 30-year-old Tokamak run by General Atomics. It does really important science. It has really good diagnostics, but it is not a new machine. It’s not breaking new ground.  The next largest experiment is Princeton Plasma Physics Lab’s National Spherical Torus Experiment-Upgrade (NSTX-U).  JT: The NSTX is quite an old facility.  AH: They intend to reopen an upgraded facility for experiments next year, but we haven’t been able to do experiments on it for nearly a decade.  So if you look at those three facilities I just mentioned, that’s the bulk of the DOE fusion budget. But programs aimed at commercialization must include building the fusion infrastructure I mentioned earlier. We need to make investments in both.  Now I would love it if we could have “a rising tide that lifts all boats”. If we had a billion-dollar program or more in the Fusion Energy Sciences, then we could do all of these things.  There is still good science coming out of DIII-D, and we expect to see really good science coming out of NSTX-U. But it’s not clear to us that this is better than the science that will come out of the private sector, where companies are building the next generation of these machines.       JT: Are you thinking of an analogous process to the commercialization of space flight, with the transfer from NASA to SpaceX and other private companies?  AH: This is exactly it.  In 2006 NASA was looking to replace the space shuttle for access to the International Space Station. They had their plan, the Constellation and Orion programs, that was to build rockets to deliver astronauts to the space station and ultimately to Mars. A small group within NASA said, well, there are private space companies coming up, SpaceX and others.  Originally, nobody thought that they could ever actually do this, but NASA said, okay, here’s $500 million, let’s do a public-private partnership with them. They called the project COTS, Commercial Orbital Transportation Services, which aimed to develop private spacecraft to take deliveries, and ultimately astronauts, to the International Space Station.   The NASA COTS program invested directly into SpaceX in a milestone-based format. That means SpaceX only got paid when they reached milestones. The ultimate milestone, of course, was delivering an astronaut to the International Space Station. But they negotiated and agreed on multiple milestones along the way.  Finally, of course, SpaceX did succeed, and now they’re able to do it for 10 times less than what NASA had originally planned to spend. So we’re at that same moment in fusion right now, with the equivalent of the NASA COTS program – a milestone-based public-private partnership program.  Hong Kong Sign up for one of our free newsletters  The Daily Report Start your day right with Asia Times' top stories  AT Weekly Report A weekly roundup of Asia Times' most-read stories Email Address Sign up They have put it into place, but the government just hasn’t given it $500 million – or anywhere near what’s needed. To date, only $46 million has been allocated to companies. And we expect another $40 million to come in this year’s budget when they complete it next year. But to be impactful, you need to add a zero to those numbers. You need an order of magnitude more.  We think that the milestone-based program is the way that the United States is going to get to its fusion pilot plants. It’s the classic American way. It’s your private sector and your public sector working together in partnership. The private sector takes the risk. The public sector supplies the infrastructure know-how. It’s a really exciting way to do it.  JT: Coming back to China, how would you characterize their effort and what do you think are the most important projects they have coming online?  AH: You said it seems like there’s a government plan. China is not the Soviet Union. It has morphed into something different than a classic command top-down economy, and some internal competition seems to be happening. There are private companies involved. We know three private fusion companies in China: ENN, Startorus Fusion and Energy Singularity.  There’s probably more, but those are the ones that have been significantly funded and are doing important work as of now. Energy Singularity is the one that has built a tokamak using high-temperature superconductor magnets and following basically a similar plan to what the US company Commonwealth Fusion Systems is building at the moment. The other two companies are looking towards other varieties of tokamaks.  So there is a private sector approach, which is increasingly well-funded. And then there is a government program. But of course, the government in China is both, Beijing, central government funded, as well as state-owned enterprises. They have created a new China Fusion Corporation that looks to be a delivery vehicle for what they are calling BEST – the Burning Plasma Experimental Superconducting Tokamak.  This is not a high temperature superconducting tokamak, but a more classic low-temperature superconductor device, but it will be an ITER-class machine — a machine that will reach fusion break-even. They are building it right now in Hefei, in Anhui province, not far from the CRAFT platform, the Comprehensive Research Facility for Fusion Technology.  What’s interesting is that if you look at the company registrations and funding, a very significant amount of funding into this government program has come from, nominally, private investors. Leading among these is the electric vehicle company NIO.  We’ve done some digging into Chinese public corporate records and it looks like the NIO is at least partially funding the building of BEST and it is unclear who is funding the China Fusion Corporation. To be clear, I haven’t actually talked to them and I don’t know and of that for sure.  And it is hard to be sure about any of this, because China is a different system than it was 10 years ago. It’s not as open. But that said, Chinese scientists, both public companies and private companies, are fully engaged in the international fusion sector, and they participate in global meetings on fusion science. They’re there to learn and they are there to share their details.  Still, some aspects remain opaque. There was an announcement late last year of the formation of a China Fusion Corporation; a press release was put out by the China National Nuclear Corporation. But within a day or two, that press release was taken off the Internet. I have an English language translation, but you can’t get the source anymore.  JT: In view of all the talk about China as a strategic rival of the US, do you see a national security angle in the race to realize a pilot fusion power plant?  AH: Any concentrated source of electric power that doesn’t rely on energy resources from an unstable world is national security related.  JT: What if China were to win the race to commercial fusion energy?  AH: If the Chinese get to fusion first, we shouldn’t expect that this would just be a pure market-based approach. What we should expect is that China will use its newfound leadership in fusion in global geopolitical affairs. We should expect that they will use it throughout their Belt and Road partner nations, further tying them into a centralized, Beijing-led whole order.  So fusion is more than just something the United States should do because it’s good for business and good for the climate. Examples from other industries show that China will take this and make it central to their global effort to put China at the center of the global geopolitical order.  JT: Would you compare this with the race to get to the Moon?  AH: It’s similar in that we’re seeing a global race and multiple players work towards something very technologically challenging. But, I have to say – while going to the Moon was and is an extraordinary achievement – if you can produce power without emissions and without dependence on potentially hostile external sources, it’s much more impactful on the day-to-day life of the people living in your country.

#### 4. Trump Thumps

**Schuman 25** [Michael Schuman, nonresident senior fellow in the Atlantic Council’s Global China Hub, 2-18-2025, Trump Hands the World to China, Atlantic, https://www.theatlantic.com/international/archive/2025/02/foreign-policy-mistake-china/681732/, Willie T.]

American global leadership is ending. Not because of “American decline,” or the emergence of a multipolar world, or the actions of U.S. adversaries. It’s ending because President Donald Trump **wants to** end it.

Just about all of Trump’s policies, both at home and abroad, are **rapidly destroying** the foundation of American power. The main beneficiary will be the Chinese leader Xi Jinping, who has been planning for the moment when Washington stumbles and allows China to replace the United States as the world’s superpower. That Trump is willing to hand the world over to Xi—or doesn’t even realize that’s what he’s doing—shows that his **myopic worldview**, **admiration for autocrats**, and **self-obsession** are combining to threaten international security and, with it, America’s future.

Trump is choosing to retreat even though the U.S. has its adversaries on the back foot. President Joe Biden’s foreign policy was working. By supporting Ukraine’s defense against Russia’s invasion, Biden weakened Moscow so severely that President Vladimir Putin had to turn to North Korea for help. His backing of Israel in its war with Hamas in Gaza undercut Iran’s influence in the Middle East. And Biden’s strengthening of the U.S. global-alliance system pressured and unnerved China as the world’s advanced democracies banded together against Xi and his plans to upset the world order.

Now Trump is voluntarily **throwing away** this hard-won leverage. The supposed master negotiator is signaling his **willingness to sacrifice Ukraine** to Russia before formal negotiations even start. Last week, U.S. Defense Secretary Pete Hegseth called a restoration of Ukraine to its borders before Russia snatched Crimea in 2014 an “unrealistic objective,” indicating that the administration would accept a peace deal that allows Putin to keep part of the independent nation he invaded. Hegseth also rejected NATO membership for Ukraine—the possibility of which was Putin’s pretext for invading in the first place. That wouldn’t be a bad outcome for Putin after starting a brutal war and effectively losing it.

But the big winner from such a settlement will be China. Because China is Russia’s most important partner, any gains that Putin can salvage from his disastrous war forwards the two dictators’ global agenda. That’s why Xi is egging Trump on. Beijing has reportedly proposed holding a summit between Trump and Putin to resolve the Ukraine war. Then Chinese construction companies would try to swoop in and earn a fortune rebuilding a shattered Ukraine, which Xi helped Putin destroy by supporting Russia’s sanctions-plagued economy.

More than that, Xi certainly realizes that Trump’s **pandering** to Putin offers Xi a chance to break up the Atlantic alliance and **entrench Chinese influence** in Europe. Vice President J. D. Vance **blasted European allies** at last week’s Munich Security Conference for marginalizing extremist right-wing political parties, and Chinese Foreign Minister Wang Yi took the opportunity to present Xi as the anti-Trump. “China will surely be a factor of certainty in this multipolar system and strive to be a steadfast constructive force in a changing world,” he told the attendees.

European leaders are not likely to have forgotten that Xi enabled Putin’s war in Ukraine. But if Trump won’t guarantee European security, Xi may well seize the opportunity to **expand Chinese power** by offering to step into the breach. Xi could make the case that he is able to rein in Putin, protect Ukraine, and preserve stability in Europe. That promise could well be an empty one; Xi may not be willing or even able to restrain an emboldened Putin. Still, abandoned by Washington, European leaders may hold their collective noses and look to Xi to keep the peace.

China “would start replacing the U.S. in the role of keeping Russia out of the Eastern Flank,” Gabrielius Landsbergis, the former Lithuanian foreign minister, recently posted on X. European Union members “in the East would be dependent on China’s protection and the racketeering would spread West.”

Trump is handing Xi other opportunities, too. By withdrawing from the World Health Organization and the **U**nited **N**ations **H**uman **R**ights **C**ouncil, the U.S. is clearing the field for China to make the UN system an **instrument of its global power**. **Dismantling USAID** makes China all the more **indispensable** to the developing world. Trump’s bizarre plan to deport Palestinians from Gaza will be a boon to Xi in the Middle East, a region China considers vital to its interests. Even the U.S. suspension of federal financial support for electric vehicles helps Xi by hampering American automakers in a sector Beijing seeks to dominate. China may see American retrenchment as an invitation to take more aggressive actions in pursuit of its interests—in Taiwan, but also toward other U.S. allies in Asia, including Japan, South Korea, and the Philippines.

Trump apparently assumes that he can keep Xi in check with tariffs. He imposed new duties on Chinese imports earlier this month. But Xi doesn’t seem particularly bothered. Beijing retaliated, but with little more than a face-saving gesture. The reciprocal tariffs covered a mere tenth of U.S. imports. Why fuss about a few shipments of stuffed toys when you can take over the world?

The damage to American global standing could be **irreparable**. The hope now is that the major democracies of Europe and Asia—France, Germany, Italy, Japan, and the United Kingdom—will stop up the power vacuum Trump is creating and keep China out of it. European leaders do not have to abide by whatever deal Trump cooks up with Putin for Ukraine. They could hold firm, continue the war, and wait for a new administration in Washington to reaffirm U.S. security commitments. But the course is risky, because erstwhile U.S. allies can’t assume that Washington will ever reestablish global leadership, or that if it does, the promises of future presidents will endure. That uncertainty may compel the allied democracies to make accommodations with China as best they can.

Trump’s administration may be seeking to settle matters with Putin in order then to concentrate limited U.S. resources on confronting China. But this course may succeed only in making China more difficult to contend with, because America will be forced to do so without its traditional allies by its side.

Trust, once lost, is **difficult to restore**. Trump’s premise seems to be that what happens in Europe and Asia is of little consequence to the United States. Vance invoked Catholic theology (erroneously, according to Pope Francis) to justify a hierarchy of concern that places caring for U.S. citizens ahead of the rest of the world. But what, exactly, is best for Americans?

Trump may be right that other powers should do more to take care of their own affairs. But Americans know as well as anyone that what happens in the far-flung corners of the world—whether in Europe in the 1930s and ’40s or in Afghanistan at the turn of the 21st century—can and often does affect them, even dragging them into **conflicts** they do not want to fight. That doesn’t mean Washington must police every dispute. But by ceding global leadership to authoritarian China, Trump is creating a world that will almost certainly be **hostile to the United States**, its prosperity, and its people.

#### 5. No China war --- transition theory has exceptions, prefer our specific warrants.

**Krulak 21** [Charles Krulak, retired four-star general & former commandant of the US Marine Corps, 8-17-2021, The US and China Are Not Destined for War, Project Syndicate, https://www.project-syndicate.org/commentary/us-china-not-destined-for-war-by-charles-c-krulak-and-alex-friedman-1-2021-08, LFS—SR + recut-WT]

True, throughout history, when a rising power has challenged a ruling one, war has often been the result. But there are notable exceptions. A war between the US and China today is **no more inevitable** than was war between the rising US and the declining United Kingdom a century ago. And in today’s context, there are four compelling reasons to believe that war between the US and China can be avoided. First and foremost, any military conflict between the two would quickly **turn nuclear**. The US thus finds itself in the same situation that it was in vis-à-vis the Soviet Union. Taiwan could easily become this century’s tripwire, just as the “Fulda Gap” in Germany was during the Cold War. But the same dynamic of “**m**utual **a**ssured **d**estruction” that limited US-Soviet conflict applies to the US and China. And the **international community** would do everything in its power to ensure that a potential nuclear conflict did not materialize, given that the consequences would be fundamentally transnational and – unlike climate change – immediate. A US-China conflict would almost certainly take the form of a **proxy war**, rather than a major-power confrontation. Each superpower might take a different side in a domestic conflict in a country such as Pakistan, Venezuela, Iran, or North Korea, and deploy some combination of economic, cyber, and diplomatic instruments. We have seen this type of conflict many times before: from Vietnam to Bosnia, the US faced surrogates rather than its principal foe. Second, it is important to remember that, historically, China plays a long game. Although Chinese military power has grown dramatically, it still lags behind the US on almost every measure that matters. And while China is investing heavily in asymmetric equalizers (long-range anti-ship and hypersonic missiles, military applications of cyber, and more), it will not match the US in conventional means such as aircraft and large ships for decades, if ever. A head-to-head conflict with the US would thus be too dangerous for China to countenance at its current stage of development. If such a conflict did occur, China would have few options but to let the nuclear genie out of the bottle. In thinking about baseline scenarios, therefore, we should give less weight to any scenario in which the Chinese consciously precipitate a military confrontation with America. The US military, however, tends to plan for worst-case scenarios and is currently focused on a potential direct conflict with China – a fixation with overtones of the US-Soviet dynamic. This raises the risk of being blindsided by other threats. Time and again since the Korean War, asymmetric threats have proven the most problematic to national security. Building a force that can handle the worst-case scenario does not guarantee success across the spectrum of warfare. The third reason to think that a Sino-American conflict can be avoided is that China is already **chalking up victories in** the global **soft-power** war. Notwithstanding accusations that COVID-19 escaped from a virology lab in Wuhan, China has emerged from the pandemic looking much better than the US. And with its **B**elt and **R**oad **I**nitiative to finance infrastructure development around the world, it has aggressively stepped into the void left by US retrenchment during Donald Trump’s four-year presidency. China’s leaders may very well look at the current status quo and conclude that they are on the **right strategic path**. Finally, China and the US are deeply **intertwined economically**. Despite Trump’s trade war, Sino-American bilateral trade in 2020 was around $650 billion, and China was America’s largest trade partner. The two countries’ supply-chain linkages are vast, and China holds more than $1 trillion in US Treasuries, most of which it cannot easily unload, lest it reduce their value and incur **massive losses**.

**6. Lack of tritium means no scaling and lack of popularity.**

**Katwala 22** [Amit Katwala, Degree in experimental psychology from Oxford & senior writer @ WIRED with a focus on Science, 5-20-2022, Nuclear Fusion Is Already Facing a Fuel Crisis, WIRED, https://www.wired.com/story/nuclear-fusion-is-already-facing-a-fuel-crisis/, Willie T.]

In the south of France, ITER is inching towards completion. When it’s finally fully switched on in 2035, the International Thermonuclear Experimental Reactor will be the largest device of its kind ever built, and the flag-bearer for nuclear fusion.

Inside a donut-shaped reaction chamber called a tokamak, two types of hydrogen, called deuterium and tritium, will be smashed together until they fuse in a roiling plasma hotter than the surface of the sun, releasing enough clean energy to power tens of thousands of homes—a limitless source of electricity lifted straight from science fiction.

Or at least, that’s the plan. The problem—the **white elephant** in the room—is that by the time ITER is ready, there might not be enough fuel left to run it.

Like many of the most prominent experimental nuclear fusion reactors, ITER relies on a **steady supply** of both deuterium and tritium for its experiments. Deuterium can be extracted from seawater, but tritium—a radioactive isotope of hydrogen—is **incredibly rare.**

Atmospheric levels peaked in the 1960s, before the ban on testing nuclear weapons, and according to the latest estimates there is less than 20 kg (44 pounds) of tritium on Earth right now. And as ITER drags on, years behind schedule and billions over budget, our best sources of tritium to fuel it and other experimental fusion reactors are **slowly disappearing.**

Right now, the tritium used in fusion experiments like ITER, and the smaller JET tokamak in the UK, comes from a very specific type of nuclear fission reactor called a heavy-water moderated reactor. But many of these reactors are reaching the end of their working life, and there are fewer than 30 left in operation worldwide—20 in Canada, four in South Korea, and two in Romania, each producing about 100 grams of tritium a year. (India has plans to build more, but it is unlikely to make its tritium available to fusion researchers.)

But this is not a viable long-term solution—the whole point of nuclear fusion is to provide a cleaner and safer alternative to traditional nuclear fission power. “It would be an absurdity to use dirty fission reactors to fuel ‘clean’ fusion reactors,” says Ernesto Mazzucato, a retired physicist who has been an outspoken critic of ITER, and nuclear fusion more generally, despite spending much of his working life studying tokamaks.

The second problem with tritium is that it **decays quickly**. It has a half-life of 12.3 years, which means that when ITER is ready to start deuterium-tritium operations (in, as it happens, about 12.3 years), half of the tritium available today will have decayed into helium-3. The problem will only get worse after ITER is switched on, when several more deuterium-tritium (D-T) successors are planned.

These twin forces have helped turn tritium from an unwanted byproduct of nuclear fission that had to be carefully disposed of into, by some estimates, the most expensive substance on Earth. It costs $30,000 per gram, and it’s estimated that working fusion reactors will need up to 200 kg of it a year. To make matters worse, tritium is also coveted by nuclear weapons programs, because it helps makes bombs more powerful—although militaries tend to make it themselves, because Canada, which has the bulk of the world’s tritium production capacity, refuses to sell it for nonpeaceful purposes.

In 1999, Paul Rutherford, a researcher at Princeton’s Plasma Physics Laboratory, published a paper predicting this problem and describing the “tritium window”—a sweet spot where tritium supplies would **peak before declining** as heavy-water-moderated reactors were switched off. We’re in that sweet spot right now, but ITER—running almost a decade behind schedule—isn’t ready to take advantage of it. “If ITER had been doing deuterium-tritium plasma like we planned about three years ago, everything kind of would have worked out fine,” says Scott Willms, fuel cycle division leader at ITER. “We’re hitting the **peak** of this tritium window roughly now.”

Scientists have known about this potential stumbling block for decades, and they developed a neat way around it: a plan to use nuclear fusion reactors to “breed” tritium, so that they end up replenishing their own fuel at the same time as they burn it. Breeder technology aims to work by surrounding the fusion reactor with a “blanket” of lithium-6.

When a neutron escapes the reactor and hits a lithium-6 molecule, it should produce tritium, which can then be extracted and fed back into the reaction. “Calculations suggest that a suitably designed breeding blanket would be capable of providing enough tritium for the power plant to be self-sufficient in fuel, with a little extra to start up new power plants,” says Stuart White, a spokesperson for the UK Atomic Energy Authority, which hosts the JET fusion project.

Tritium breeding was originally going to be tested as part of ITER, but as costs ballooned from an initial $6 billion to more than $25 billion it was quietly dropped. Willms’ job at ITER is to manage smaller-scale tests. Instead of a full blanket of lithium surrounding the fusion reaction, ITER will use suitcase-sized samples of differently presented lithium inserted into “ports” around the tokamak: ceramic pebble beds, liquid lithium, lead lithium.

Even Willms admits that this technology is a **long way** from being ready to use, however, and a full-scale test of tritium breeding will have to wait until the next generation of reactors, which some argue might be too late. “After 2035 we have to construct a new machine that will take another 20 or 30 years for testing a crucial task like how to produce the tritium, so how are we going to block and stop global warming with fusion reactors if we will not be ready until the end of this century?” says Mazzucato.

The tritium problem is **fueling skepticism** of ITER, and D-T fusion projects more generally. These two elements were initially chosen because they fuse at a relatively low temperature—they’re the easiest things to work with, and it made sense in the early days of fusion. Back then, everything else seemed impossible.

But now, with the help of AI-controlled magnets to help confine the fusion reaction, and advances in materials science, some companies are exploring alternatives. California-based TAE Technologies is attempting to build a fusion reactor that uses hydrogen and boron, which it says will be a cleaner and more practical alternative to D-T fusion.

It’s aiming to reach a net energy gain—where a fusion reaction creates more power than it consumes—by 2025. Boron can be extracted from seawater by the metric ton, and it has the added benefit of not irradiating the machine as D-T fusion does. TAE Technologies CEO Michl Binderbauer says it’s a more commercially viable route to scalable fusion power.

But the mainstream fusion community is still pinning its hopes on ITER, despite the potential supply problems for its key fuel. “Fusion is **really, really difficult**, and anything other than deuterium-tritium is going to be **100 times more difficult**,” says Willms. “A century from now maybe we can talk about something else.”